Project number: **T23-407/13-N**

RESEARCH GRANTS COUNCIL
THEME-BASED RESEARCH SCHEME (TRS)

Completion Report on Funded Project

Project start date: *1 Jan 2014*
Project completion date: *31 Dec 2018*

1. Project Title: Smart Solar Energy Harvesting, Storage and Utilization

2. Names and Academic Affiliations of Project Team Members#

Project team member	Name / Post	Unit / Department / Institution	Average number of hours per week spent on this project in the whole project period
Project Coordinator (PC)	[1] Prof. Ching Ping WONG / Professor (Subtopic (ST) 4) (Jan 2014 – Jul 2018)	Dept of Electronic Erg. / CUHK	5hrs
Project Coordinator (PC)	[1] Prof. Jian-Bin XU / Professor (Subtopic (ST) 2) (Aug 2018 – Dec 2018)	Dept of Electronic Erg. / CUHK	7hrs
Co-Principal Investigator(s)	Prof. Xu-Dong XIAO / Professor (ST1)	Dept of Physics / CUHK	7hrs
	Prof. Jimmy C. YU / Professor (ST3)	Dept of Chemistry / CUHK	7hrs
	[2] Prof. Ni ZHAO / Asso. Professor (ST4)	Dept of Electronic Engineering / CUHK	5hrs
	[3] Prof. Minghua CHEN / Asso. Professor (ST5)	Dept of Information Erg. / CUHK	9hrs
	[4] Prof. Zhao XU / Professor (ST6)	Department of Electrical Erg. / PolyU	13hrs
Co-Investigator(s)	Subtopic 1: High Performance Vacuum Deposited Thin		

	Film PV Cells and Modules	
	Quan LI, Professor, Physics/CUHK	5hrs
	Xinhui LU, Assist. Prof., Physics/CUHK	7hrs
	Jiannong WANG, Professor, Physics/HKUST	5hrs
	Xieqiu ZHANG, Associate Professor, Ctr for PV Solar Cells/Shenzhen Inst. of Advanced Technology, CAS	5hrs
	Subtopic 2: Solution Processed Excitonic Solar Cells	
	Shih-Chi CHEN, Asso. Prof., Mechanical and Automation Engineering./CUHK	4hrs
	Keyou YAN, Research Assist. Professor, Electronic Erg/CUHK	10hrs
	He Henry YAN, Asso. Prof., Chemistry/HKUST	5hrs
	Ni ZHAO, Asso. Prof., Electronic Erg/CUHK	5hrs (ST2)
	Subtopic 3: Alternative Solar Technologies	
	Aaron Ho-Pui HO, Professor, Electronic Erg/CUHK	5hrs
	Wei-Hsin LIAO, Professor, Mechanical and Automation Erg/CUHK	5hrs
	Kee-Pui Dennis NG, Professor/AVP, Chemistry/CUHK	5hrs
	Hock-Chun Daniel ONG, Asso. Prof., Physics/CUHK	5hrs
	Jianfang WANG, Professor, Physics/CUHK	10hrs
	Dongyan XU, Asso. Prof., Mechanical and Automation Erg/CUHK	10hrs
	Subtopic 4: Energy Storage	
	[5] Ching-Ping WONG, Emeritus Prof./CUHK (since Sept 2018); Chair Professor, Georgia Institute of Technology	5 hrs
	Yi-Chun LU, Assist. Prof., Mechanical and Automation Erg/CUHK	15hrs
	Subtopic 5: Microgrid Monitoring, Management, and Comprehensive Security	
	[6] Jianwei HUANG, Professor, Information Erg/CUHK	7hrs
	Kehuan ZHANG, Assist. Prof., Information Erg/CUHK	10hrs
	Yingjun ZHANG, Asso. Prof., Information Erg/CUHK	10hrs
	Subtopic 6: Laboratory and Field Demonstration of MGs with PV Modules and Smart Storage	
	Zhao Yang Joe DONG, Professor in Energy Systems, School of Electrical Engineering and Telecommunications, The University of New South Wales	5hrs
	David HILL, Chair Professor, HKU/Prof (PT), Univ of Sydney; Electrical & Electronic Erg/HKU, Ctr for Future Energy Networks, School of Electrical and Information Engineering/Univ. of Sydney, Australia	3hrs
	Hon Wing NGAN, CEO, Asia-Pacific Research Institute of Smart Grid and Renewable Energy (APRI-SGRE)	5hrs
	Dong-ning WANG, Asso. Prof., Electrical Erg/PolyU	5hrs
	Shengwei WANG, Chair Professor, Department of Building Services Erg/PolyU	3hrs
	Siu-Chung WONG, Asso. Prof., Electronic & Information Erg/PolyU	5hrs

Collaborators	Collaborators: Peidong YANG, Distinguished Professor of Energy, Chemistry/University of California, Berkeley, USA Tobin MARKS, Professor/NAS & NAE Member, Materials Science & Engineering /Northwestern University, USA Reza S. ABHARI, Professor & Director of Laboratory for Energy Conversion Swiss Federal Institute of Technology, Zurich (ETH), Switzerland Shao-Horn YANG, Professor, Materials Science and Engineering, MIT, USA Jun-Hao CHU, Professor/CAS Member, Shanghai Institute of Technical Physics Institute, Chinese Academy of Sciences Sishen XIE, Professor/CAS Member, Institute of Physics, Chinese Academy of Science Jacob ØSTERGAARD, Professor and Centre Head, Electrical Engineering/Technical University of Denmark, Denmark Nikolaos HATZIARGYRIOU, Professor, Electrical & Computer Engineering, National Technical University of Athens, Greece Eugeny ERMILOV, Researcher, Division 1.10 – Biophotonics, BAM Federal Institute for Materials Research and Testing, Germany David TSE, Professor, Electrical Engineering & Computer Science, University of California at Berkeley, USA Shunichi FUKUZUMI, Professor, Chemistry, Osaka University, Japan Takumi KINOSHITA, Project Assistant Professor, Research Center for Advanced Science and Technology, The University of Tokyo, Japan Xiaojun LIN, Asso. Prof., Electronic and Computer Engineering, Purdue University, USA Xusheng XUE, Professor and Honourable President, CAE Member, State Grid Electric Power Research Institute, China Industrial Supporters: T. F. CHOW, Director, Power System, CLP Power Hong Kong Ltd. Dr. Michael CHANG, Chairman, ATL, Hong Kong. Ying LIANG, Chief Engineer, Power Distribution Department, China Electric Power Research Institute Dr. Pei ZHANG, Director of Smart Grid, Accenture Dr. C.C. HSU, Senior Vice President, Polyera Co., USA Jin DONG, Executive of Industry Solutions, IBM-Research, China ADF Battery Co. Shenzhen Topray Solar Co. Ltd. Sunvim Solar Technology Co., Ltd.	N.A.

Please highlight the approved changes in the project team composition and quote the date when the RGC granted approval of such changes. For changes in the project team composition, please submit a separate request, together with the justification and the curriculum vitae of the new member(s), to the RGC three months prior to the intended effective date of the change.

[1] Prof. Jian-Bin XU replaced the PC role of Prof. Ching-Ping WONG with effect since 1 Aug. 2018.
[2] Prof. Ni Zhao replaced the Co-PI role of Prof. Ching-Ping WONG with effect since 1 Aug. 2018.
[3] Prof. Minghua CHEN replaced the Co-PI role of Prof. Dah Ming Chiu with effect since 1 Aug 2017.
[4] Title of Prof. Zhao XU has been upgraded to Professor with effect since 1 July 2017.
[5] The role of Prof. Ching-Ping WONG was changed from PC and Co-PI into Co-I with effect since 1 Aug. 2018.
[6] Title of Prof. Jianwei HUANG has been upgraded to Professor with effect since 1 Aug. 2017.

3. Project Objectives

Summary of Objectives addressed/achieved:

Objectives*	Percentage achieved	Remarks**
(1) To develop new materials and processing techniques for thin film photovoltaic (PV) devices and modules based on thin film chalcopyrite and earth-abundant kesterite materials.	100%	ST1 has developed several new processing techniques for active and buffer layers which lead to device improvements from many aspects. The module fabrication technique has also been improved resulting in better module efficiency. A star-up company has been established.
(2) To create an interdisciplinary research platform for fundamental research in solution-processed thin film photovoltaic devices and modules based on inorganic and organic active materials.	100%	ST2 has advanced the material processing and characterization methods to improve the stability of perovskite solar cells and organic photovoltaic (OPV) devices, as well as setting a new world-record efficiency. The output has had significant impact on development of perovskite and organic PV devices. Related papers have been totally cited c.a. 10,000. A star-up company has been established.
(3) To develop novel light-trapping schemes for the enhancement of photovoltaic efficiency.	100%	ST3 has fabricated highly effective upconversion nanomaterials for converting infrared light to visible/ultraviolet light. Highly pure and uniform colloidal silver nanorods with controllable multipolar plasmon modes, colloidal gold nanocups supporting strong magnetic plasmon resonance, and colloidal cuprous oxide nanospheres supporting strong electromagnetic plasmon resonances have been synthesized. The latter three types of metal nanostructures all support electromagnetic resonances beyond the electric-dipole plasmon resonances that are possessed by common metal nanoparticles.

Objectives*	Percentage achieved	Remarks**
(4) To explore novel metal oxides and organic dyes for chemical fuels via artificial photosynthetic and photocatalytic processes.	100%	ST3 has designed and synthesized a series of new organic dyes and artificial photosynthetic systems, and examined their photo-induced processes, with their potential application in production of chemical fuels to be explored. ST3 has found gold-titania and gold-ceria hybrid nanomaterials to exhibit strong plasmonic and photocatalytic properties. Very recently a remarkable enhancement in OER activity by introducing cerium into Co_3O_4 is reported.
(5) To develop new materials and processing approaches for high energy-density batteries and high performance supercapacitors to be applicable for Microgrids (MGs).	100%	ST4 has developed new redox active materials and implemented into full flow cells for both aqueous and nonaqueous flow batteries and high performance supercapacitors as well as hybrid energy storage systems. They successfully demonstrated new high-energy-density redox flow battery prototypes for microgrid integration. These developments have rendered significant improvement in both energy density and power density.
(6) To develop advanced strategies to integrate and control various subsystems including charging and discharging of battery banks of similar or dissimilar properties to enhance the MG-stability in response to various operation conditions.	100%	ST5 has developed various strategies for different components in a microgrid, for example the local generator, demand response system, and storage system. They can potentially improve the robustness and efficiency of a microgrid. They have also developed effective measures for device fingerprinting and intrusion detection in microgrids.
(7) To develop grid monitoring and control schemes based on proper ICT standards and protocols to ensure power system security.	100%	ST6 has developed LabVIEW based monitoring and control system and fully completed LAB MG control and management system. Based on this microgrid test-bed, ST6 and ST5 worked closely and successfully implemented optimal MG scheduling algorithm (i.e. CHASE), which is newly developed by ST5. Several important modifications are made to the original algorithm in order to fit with the requirements of the practical implementation. At the same time, ST6 and ST5 has collaboratively completed the initial study on the cyber security of MG control system.
(8) To conduct field demonstration of MG operations based on intelligent control and integration of thin film PV modules, smart storages and loads and other technologies for providing electricity in student hostels under interconnected and islanded modes.	85%[#1]	ST6, ST5, and ST1 have collaboratively developed the lab and field MG designs, and completed the implementation of Lab MG, where 4 pieces of commercial CIGS solar panels have been added into the Lab MG. The Lab MG is ready for field demonstration in both grid-connected and stand-alone modes. ST5 and ST6 have jointly published serval technical papers to report the scientific achievements. Meanwhile, ST6 has developed the smart micro converter control strategies including frequency responsive control and low voltage ride through control, and validated them via simulations and hardware. The Hostel MG has been designed and implemented as well as tested, where commercially-available

Objectives*	Percentage achieved	Remarks**
		CIGS solar panels were installed since 2017. The panels would be replaced by home-made CIGS panels provided by ST1, but has to be revised. ST2 has prepared prototypes of OPV solar modules, but the power scale is not yet sufficient to support a full mini-scale lab microgrid demonstration.

* *Please highlight the approved changes in objectives and quote the date when the RGC granted approval of such changes.*

****** *Please provide reasons for significantly slower rate of progress than originally planned.*

[#1] The Hostel MG has been demonstrated in October 2017, during the RGC on-site visit, where commercially-available CIGS solar panels were installed. However, due to the complexity and huge cost as well as the product change, the replacement by home-made CIGS modules cannot be made. Alternatively a demo with CIGS panels produced by ST1 and the microgrid by ST6 is arranged.

6. Research Highlights and Outputs

6.1 What are the most exciting research accomplishments of the project?

(Please list five or more of the team's best research accomplishments, such as journal and conference papers, software codes, research infrastructure, etc. For each item, please clearly justify how it has achieved international excellence (e.g. best paper award, invited presentation, citations, product licensed to industry, etc.))

(ST1) Record-High PCE of CIGS PV Devices and Panels.

The full-set technology of fabricating efficient CIGS cells and modules by ST1 group leads to a high-efficiency CIGS PV system (c.a. 21% PCE for single cell, and 14% PCE for module) at CUHK, as well as a start-up company "ShineTech Co Ltd." in the Xiuzhou National High-Tech Zone, Jiaxing County, Zhejiang Province of China since 2015, with an estimated production capacity of 2MW/year. The company is currently the first in its kind in China, the second in the world production line of flexible CIGS thin film solar panels based on polyimide (PI) substrate. The company currently has 3,000 m^2 clean room, 82 employees (20 of them have Master of Science or PhD degrees), and has been approved to build "Provincial Enterprise Research Institute" of Zhejiang Province and "High-Tech R&D Center" of Jiaxing County. In the field of CIGS solar cells, ST1 developed a set of recipes to achieve desired Ga grading in the $Cu(In,Ga)Se_2$ absorber. A tri-layer Mo back contact with a thin topmost cap was formed to adjust the K atom distribution and Ga gradient. This work has been published in *Energy Science & Engineering* 2019, 7: 754–763. The group also designed various deposition profiles for Ga and In in order to obtain different GGI compositions and therefore gain more photocurrent in long wavelength region as revealed by the external quantum efficiency spectra. A PCE as high as 20.3% was achieved. This work has been published in *Nano Energy* 2019, 62: 205-211. A PCE of 23.4% has been achieved by mechanically stacking the high-efficiency CIGS solar cells produced by the team and perovskite solar cells fabricated by a collaborator from the Australian National University. The corresponding work was published in *Energy Environment Science* 2018, 11: 394. ST1 has also achieved fruitful results on buffer layer engineering for Cd-free CIGS solar cells. The group has studied the substrate orientation and solution variation effects of Zn(S,O) buffer layers deposition (*Nano Energy* 2019, 58: 427-436). They successfully replaced CdS buffer layer by the environmentally-friendly Zn(S, O) buffer layers and attained a Cd-free CIGS cell with a PCE of 20.19% after a novel ammonia treatment, which was published in *Solar RRL* 2019, 3(2): 1800254. In the field of CZTS solar cells, a low-temperature formation process (LTFP) involving two-stage annealing step was developed, in comparison to the traditional ramping profile. The formation pathway has been revealed by synchrotron-based technique that the low temperature-annealing step is essential to form the CZTS phase where SnS_2 is the main reactant and a PCE efficiency of 8.58% was achieved. This work has been published in *CrystEngComm* 2016, 18: 1070–1077. Then the team employed MoO_{3-x} as the back intermediate layer to optimize the energy alignment at the rear surface and thus the device. 9.26 % efficiency was achieved (*Solar RRL* 2018, 2: 1800243). In the aspect of module development, the group established all-laser photolithography system to reduce the dead area and improved the PCE as well and optimized the MgF_2 antireflection layer and AZO thickness. So far the small size (10 cm×10 cm) module has reached an efficiency of 16.3%; and the collaborator, ShineTech Inc., has achieved 10% module efficiency on flexible polyimide substrate of 40 cm-width by roll-to-roll technology.

(ST2) Performance and Stability Improvement of High Performance Perovskite Photovoltaics

ST2 group were among the very first to address the role of chlorine in formation of an organo-lead tri-iodide perovskite crystalline film and to highlight the importance of intermediate phases during perovskite crystallization (*Advanced Functional Materials*, 2014, 24, 7102-7108). Following this work many studies have been devoted to tune the organic and inorganic precursor compositions to optimize the crystallization process of perovskite films. As a result, the publication has already received 440 citations since its publication in September 2014 and is ranked as *Highly Cited Paper* by Web of Science. The group has also developed nonstoichiometric acid-base reaction (NABR) to improve the intrinsic stability of $MAPbI_3$ perovskite up to two months, much

longer than that prepared by traditional method, with efficiency above 18%. (*Advanced Functional Materials* 2014, 24(45): 7120; 2015, 25(7): 1120; *JACS* 2015, 137(13): 4460; *Nature Communications* 2016, 7: 13503; *Nano Energy* 2017, 33: 485). ST2 further expanded the study to develop a new precursor, $HPbI_3$, which represents the first example of forming organo-lead halide perovskites from a non-PbX_2-based (X: halogen or acetate) framework (*Advanced Functional Materials*, 2015, 25: 1120-1126). The output is also ranked as *Highly Cited Paper* by Web of Science. Using this precursor ST2 achieved a slow perovskite reaction process involving exchange of hydrogen and organic cations. Such process produces formamidium lead iodide ($FAPbI_3$) films with high crystallinity (much better than those fabricated from PbX_2 precursors) and excellent thermal stability. Following this work, ST2 systematically investigated the perovskite formation, degradation and recovery processes, and proposed a "non-stoichiometric acid-base reaction" perovskite synthesis method based on the mechanistic understanding. The perovskite synthesized through this methodology can maintain the desired black phase over two months under 65% high humidity, compared to one week of the one prepared by traditional method. The work was greatly supported by globally renowned chemist - Prof. Thomas C.W. Mak at CUHK, who helped to analyze the composition and structure of $HPbI_3$ single crystal and finally unveiled the crystalline structure for the first time. The inventor of dye-sensitized solar cells and also one of the PSCs inventors - Michael Grätzel commented this work in his paper that (*Nature Energy* 2018, 3: 61) "*Changes in perovskite synthesis route can lead to a considerably higher resistivity against humidity*". Besides, this work has been cited by the PSC lead-inventor - Tsutomu Miyasaka, and other PSC trailblazers, including Sang Il Seok, Nam-Gyu Park, Anders Hagfeldt, Frank Shengzhong Liu, *et al*. (*ACS Appl. Mater. Interfaces* 2017, 9: 22; *Small* 2018, 14: 20; *ACS Appl. Mater. Interfaces* 2018, 10:17). On the basis of this method, a gas-solid method was further proposed which shows great potential for scalable, stable and high-efficiency PSC fabrication (*Nano Energy* 2017, 3; 485, ST2.27). This innovative methodology sheds light on the development of highly efficient PSCs with low cost and high stability. Another $HPbI_2Br$ is also developed to produce large grain $FAPbI_{3-x}Br_x$ based on nonstoichiometric reaction with 1.3 fold FAI, which is free of dripping anti-solvent to simplify the deposition and delivery 19+% efficiency. (*Advanced Energy Materials* 2017, 7: 1601882) ST2 also utilized the carbon electrode to fabricate HTM-free perovskite solar cell and the stability was enhanced due to shielding effects by carbon counter electrode. The infrared photoresponse was investigated and the trap state information was meticulously identified. (*Advanced Functional Materials* 2016, 26: 8545). Also ST2 found that in the basic synthetic route of perovskite, iodine and dimethylformamide (DMF) are coordinated with lead to form intermediate compound. The intermediate compounds of DMF solvates are PbI_2-DMF and $MAPbI_3$-DMF, in which the DMF molecules are connected through coordination and H-bond, respectively. After removal of the DMF, perovskite is obtained with some PbI_2 impurities and vacancies. These defects result in poor stability under moisture. Based on the analysis, it is found that perovskite is sequentially decomposed in terms of thermodynamics in the humidity degradation. Eight related papers are classified as *Highly Cited Papers* by Web of Science. Besides engineering the formation processes of the perovskite films, ST2 group also developed a molecular passivation approach, which utilizes close-packed small aromatic molecules to achieve high hydrophobicity (*Advanced Materials*, 2016, 28: 9986-9992). With the optimized passivation molecules, they demonstrated the first 19+% efficiency perovskite solar cell with long-term (> 3 months, no encapsulation) stability in humid air and achieved the lowest loss-in-potential in the perovskite solar cells reported to date. The study has been well received in the field (ranked as *Highly Cited Paper* by Web of Science), cited by reviews and articles in *Nature Energy*, *Nature Reviews Materials*, *Nature Photonics*, etc., and led to invited talks at top international conferences such as MRS and SPIE.

Design and Synthesis of New OPV Materials – Prof. Henry Yan's of ST2 at HKUST has made tremendous progress in developing new classes of OPV polymers. The achievement of high-performance thick-film polymer solar cells has been made for multiple polymer:fullerene combinations via the formation of a near ideal polymer:fullerene morphology that contained highly crystalline yet reasonably small polymer domains (*Advanced Materials* 2015, 27(6): 1015). This achievement was acclaimed as a major technological breakthrough in the renowned NREL Chart of "Best Research-Cell Efficiencies" for OPV devices. His team also discovered the Temperature-Dependent Aggregation behavior of certain polymeric donor materials and utilized this phenomenon to fabricate high performance organic solar cells. The article reporting this has been cited over 2000 times (*Nature Communications* 2014, 5: 5293). Meanwhile they also discovered a system of non-fullerene organic solar cell with a fast charge separation only requires a small driving force that can achieve an open-circuit voltage of 1.11V and a power conversion efficiency

of 9.5% (*Nature Energy* 2016, 1: 16089). Since then non-fullerene organic solar cells have been rapidly developed with PCE approaching 17% (*Nature Energy* 2018, 3(9): 720; *Chemical Reviews* 2018, 118(7): 3447). Sixteen related papers are classified as *Highly Cited Papers* by Web of Science, and three are classified as *Hot Papers*, with a total citation number near 10,000 within five years. Now Henry Yan is a founder of a start-up company "eFlexPV" (https://eflexpv.com) for commercialization of organic photovoltaic materials and technology. Also he is closely collaborated with Raynergy Tek Ltd., Taiwan (http://www.raynergytek.com/index.asp) for flexible electronics.

(ST3) Plasmonic and Upconversion Nanomaterials

ST3 group found that thermal radiation is an attractive route for photon-energy upconversion, with efficiencies higher than those of state-of-the-art energy-transfer upconversion under continuous-wave laser excitation. A maximal power upconversion efficiency of 16% was achieved from Yb^{3+}-doped ZrO_2 (*Nature Communications* 2014, 5: 5669). An elemental phosphorus photocatalyst with a record-high hydrogen evolution efficiency - a new photocatalyst based on fibrous phase red phosphorus was discovered. It can break up water molecules to form hydrogen gas under sunlight at a record-high speed (*Angewandte Chemie,* 2016, 55: 9580). Fabrication of thermoelectric generators (TEG) - thermoelectric generators were developed by combining pulsed electroplating with microfabrication processes. It achieved a power density as high as 9.2 mW cm^{-2} at a temperature difference of 52.5 K, which is the highest value reported so far for the electroplated μTEGs in the literature (*Journal of Microelectromechan. Syst.*, 2016, 25: 744).

(ST4) Development of high-energy-density redox-flow batteries (RFBs)

ST4 group developed nonaqueous sulfur-impregnated carbon as the flowing electrolyte to directly address the key challenges facing semi-solid Li-ion flow batteries (*Nature Communications* 6: 5877, 2015). Coupling with a high concentration of LiI (5M), the group successfully demonstrated a flow catholyte with the highest volumetric capacity reported to date (550 $A{\cdot}h/L_{catholyte}$, *Advanced Energy Materials* 6: 1502183, 2016). In addition to inorganic materials, ST4 developed nonaqueous RFBs based on low melting-point organic materials 1, 1-dimethylferrocene (DMFc) to achieve a volumetric capacity of 68 $A{\cdot}h/L_{catholyte}$ with an average cell voltage of 3.1 V, translating to an energy density ~ 210 $W{\cdot}h/L_{catholyte}$ (*ACS Energy Letters* 2017, 2: 869-87). For the negolyte (or anolyte) development, ST4 reported a silicon−carbon nanocomposite semi-solid negolyte, achieving a high reversible capacity (>1200 $mA{\cdot}h{\cdot}g^{-1}$) and stable cycle life (>100 cycles). Exploiting Si−C nanocomposite as the negolyte effectively suppresses the volume change of Si particles and enhances the electrical conductivity of the negolyte. Coupling with highly concentrated LiI (5.0 M), a full all-flow cell was achieved with a stable cycle life (>60 cycles), high Columbic efficiency (>90%), and a high full cell voltage (3.0 V). (*Chemistry of Materials* 2017, 29: 7533−7542). In addition to nonaqueous RFB, ST4 developed a new aqueous RFB (ARFB) based on Zinc/Iodine-Bromide that achieved unprecedented high energy density (101 W·h/L) for ARFBs by exploiting bromide ions (Br^-) as a complexing agent to stabilize iodine, forming iodine–bromide ions (I_2Br^-), which frees up iodide ions and increases the capacity. (*Energy & Environmental Science,* 2016, 10(3): 735).

Development of novel electrode materials for high energy density supercapacitors - The group has developed a scalable fabrication method to produce nitrogen-doped hierarchically porous carbon foam (HP-CF) via annealing of soft-template-tasted melamine foam. The HP-CF integrates a large number of macropores and micropores, thus providing sufficient space for ion transport while offering a large amount of surface sites for energy storage. The work demonstrates that the HP-CF performs greatly when acting as the mechanical support for pseudocapacitive materials such as $NiCo_2S_4$ and Fe_2O_3, based on which an asymmetric supercapacitor with excellent volumetric power density and energy density was achieved. The work has been published on *Nano Energy* (*Nano Energy*, 2016, 25: 193-202) and ranked as *Highly Cited Paper* by Web of Science. The group has also developed multiple nanostructured anode and cathode materials for high-energy density asymmetric supercapacitors (e.g., *Nano Energy* 2015, 15: 719–728; 2016, 21: 145-153; *Journal of Materials Chemistry* A 2015, 3: 17385-17391). In particular the asymmetric supercapacitor consisting of a graphene/porous Fe_2O_3 nanocomposite-based anode and a CoNi-layered double hydroxide/carbon nanotube composite-based cathode exhibited high energy and power densities of 98.0 $W{\cdot}h{\cdot}kg^{-1}$ and 22,826 $W{\cdot}kg^{-1}$, which are among the best values reported to date for asymmetric supercapacitors (*Nano Energy* 2015, 15: 719–728).

(ST5) Development of Intelligent Algorithm for Scheduling

ST5 group broke through the conventional prediction-based scheduling paradigm and proposed an online algorithm called CHASE (Competitive Heuristic Algorithms for Scheduling Energy-generation), which does not rely on demand/renewable-generation prediction and is based on intelligent tracking of the behaviors of perfect dispatch. A lot of experimental evidences showed that it was able to bring about remarkable 20% cost saving. (*IEEE Transactions on Smart Grid,* 2018, 9(6): 6183-6193). The team conducted extensive research on the integration of energy storage devices, including electric vehicles and battery-energy-storage systems, in smart power grids. In particular, the team developed optimal planning and operation mechanisms for energy storage systems from online optimization, data-driven, and market driven perspectives. The work has led to publications, including an *ESI Highly Cited Paper*, in top-tier transactions and conferences (*IEEE Transactions on Smart Grid*, 2018, 9(1): 323-335). The team worked with Lee Woo Shing College at CUHK to make the College a showcase for renewable energy usage and smart hostel. In particular, the team developed a smart energy conservation system based on data collected by smart meters that let students understand their energy usage compared to peers, and created a methodology for designing data-analytic polices based on systematic grouping of students according to their behavior. The work has helped Lee Woo Shing College won renewable energy and smart hostel awards in Hong Kong in 2018. Also the work was published in top international workshops on the subject.

(ST6) Laboratory Microgrids Demo.

ST6 group successfully established a laboratory microgrid (MG) system in Hong Kong with a total power capacity up to 5kW, of which both islanded and grid-connected operations can be flexibly implemented. The developed microgrid system is the first-of-its-kind in Hong Kong, which is fully scalable and controllable offering an ideal testbed for various developed grid operation and control algorithms. In addition, an online heuristic microgrid (MG) scheduling algorithm for Lab MG has been successfully implemented through close collaboration between ST5 and ST6, which now becomes a more advanced demo case for secure and economic operation of MG through optimal coordinating and dispatching different available resources. Moreover, ST6 also developed several novel algorithms for probabilistic prognosis of renewables (solar and wind) in collaboration with Hong Kong Observatory (HKO), and several high quality publications including one invited paper by *IEEE Transactions on Power System* and several *Highly Cited Papers* by Web of Science. Two patents have been filed pending for approval. ST6 also archived the sole Best Paper Award in 2018 IEEE ISGT Asia Conference (Flagship Conference in Smart Grid by IEEE), and the 2017 First Class Award (the sole one in smart grid area in 2017) in Natural Sciences of the Higher Education Outstanding Scientific Research Output Awards from the Ministry of Education, China.

6.2 What was the added value of the TRS funding, rather than standard project grant funding?
(For example, could this work have been achieved with other funding scheme, such as the General Research Fund or Collaborative Research Fund? If not, why?)

The TRS funding is critical in creating a solid interdisciplinary platform. This project has teamed up more than 30 professors and 150 graduate students and research staff from science and engineering disciplines to work cohesively, covering the emerging research topics from harvesting, storing to utilizing various forms of energy including sunlight, hydrogen fuel, infra-red light, thermal energy, and electricity. Both intra- and inter-communications and collaborations among the various subtopic groups have been essentially facilitated by this large-scale project. Without this funding, such kind of intensive collaborations would have been difficult to proceed. At the same time, the relatively long project duration (5 years) have allowed pertinent time for the project team members to develop their research foundation through research staff and student training, methodology development, and infrastructure building, which have substantially fostered the cultivation of subsequent innovative breakthroughs and advancements.

6.3 If the project has not met its original objectives, why?

1. Due to the fabrication complexity and huge scaling up cost, as well as the product and production-line changes, the team was not able to use their home-made CIGS solar panels to replace the current solar panel currently installed at the hostel in the CUHK campus within the

time period of the project. Alternatively a demo with the home-made CIGS panels produced by ST1 and the microgrid by ST6 is planned. The details are still pending subject to the research environment in Hong Kong; note that the field test was seriously delayed due to the outbreak of Covid-19 and the social unrest in Hong Kong in 2019.
2. ST2 has prepared prototypes of OPV solar modules, but the power scale is not yet sufficient to support a full mini-scale lab microgrid demonstration.

6.4 (a) Peer-reviewed journal publication(s) arising <u>directly</u> from this project:
(Please attach a copy of the publication and/or the letter of acceptance if not yet submitted in the previous progress report(s). All listed publications must acknowledge RGC's funding support by quoting the specific grant reference. Please mark the symbol "#" next to the publications involving inter-institutional collaborations)

There are 296 published journal papers and 2 book chapter. More details are summarized in Appendix 1.

The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under review	Under preparation *(optional)*						

(b) Recognised international conference(s) in which paper(s) related to this project was/were delivered: *<u>(Please attach a copy of each conference abstract)</u>*

There are 89 conference presentations and/or papers. More details are listed in Appendix 2.

Month/Year/ Place	Title	Conference name	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknowledged the support of the RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
	Please see Appendix 3					

(c) RGC funding should have been acknowledged in all publication(s)/conference papers listed in (a) and (b) above. If no acknowledgement has been made in any of the publications/ papers, please indicate and provide explanations.

Several papers are not acknowledged the TRS funding due to various reasons.
<u>(ST1)</u> A paper in *Energy Environment Science* 2018, 11: 394 (No. 1.27-5) and the other one in *Phys. Rev. Materials* 2017, 1: 045403 (No. 1.28-5) were published and led by the collaborators. The acknowledgement was missed due to miscommunication.
There are 11 conference papers/abstracts in Appendix 3 without acknowledgment of TRS funding support. The main reason is due to the format and space limit.

6.5 To what extent this project has strengthened inter-institutional collaborations and other partnerships?

(Entire Project) Energy-related events organized by the project team include CUHK Energy Day 2014 and 2015, Exhibition on Germany's Energy Transition (with a CUHK Press Release issued 15 Nov 2016). In addition, X. D. Xiao, J. B. Xu and Jimmy Yu organized the Smart Materials for Solar Energy Harvesting Workshop 2016 in CUHK (with 5 Keynote Speeches, 10 Invited Talks and 22 poster presentations). **(ST1)** Since 2015, X. D. Xiao supervised a few PhD graduates from his group to launch a start-up company, Shinetech New Energy Inc., in Jiaxing County, Zhejiang Province, China. This company designed and produced a production line for flexible CIGS solar panels with a roll-to-roll technology which can fabricate solar panels on a web of Polyimide of 400 mm width continuously. The production line was installed and tested by May 2017 and the solar panel fabrication has been tested from May 2017 and the solar cell efficiency has reached 12% by Dec 2017. From then on, the incremental progress in efficiency and production yield has been made. The specially designed and produced CIGS solar panels were sent to Hong Kong in November 2019. A demo in combination with microgrid system is planned by ST6 at PolyU. **(ST1&2)** Jimmy Yu, J. B. Xu, X. D. Xiao were Program Leaders at the Institute of Environment, Energy and Sustainability of CUHK. They attended several meetings there and introduced the progress of the TRS project in 2014-2018. J. B. Xu, X. D. Xiao led the discussion of the workshop "Energy Engineering Research" hosted by the Institute on 13 June 2014. J. B. Xu hosted Prof. Arun Majumdar, Founding Director of the Advanced Research Projects Agency - Energy (ARPA-E) of Department of Energy (USA) for a Distinguished Lecture at CUHK entitled "Navigating the Turbulence of the Global Energy System" on 7 Sep 2017. J. B. Xu also met Prof. Qingbo MENG (Institute of Physics, CAS, Beijing) in June 2014, whose group was engaged in solar cells and smart grids and accumulated some useful data for smart grids. J. B. Xu and N. Zhao collaborated on mechanistic understanding of energy cascade processes in PCBM/P3HT based OPVs. N. Zhao and X. H. Lu have set up collaboration to understand morphology-property correlations in organic photovoltaic cells (OPVs), which provided fundamental insights in the operation mechanisms of OPVs. N. Zhao and S. C. Chen collaborated on developing precision roll-to-roll system for fabrication of flexible optoelectronic devices, a joint patent is granted. **(ST3)** Jimmy Yu and J. F. Wang jointly recruited a Research Assistant, Dr. P. Niu since Aug 2014, who exclusively worked on this project. The joint appointment greatly facilitated the interactions and collaborations between the two groups. The groups of J. F. Wang & Jimmy Yu worked together on the photocatalytic properties of gold-ceria hybrid nanomaterials in the late 2014 - first half 2015. The group of J. F. Wang has collaborated with Jimmy Yu's group on bifunctional electrocatalysts for water splitting and collaborated with L. Z. Zhang's group from Central China Normal University on plasmonic photocatalysis. The group of J. F. Wang has also worked with Dennis Ng on the interactions between plasmon and organic dyes. The aim was to combine the expertise in the two groups on plasmonic inorganic nanomaterials and organic dyes. They studied the use of plasmonic metal nanocrystals to enhance the light absorption and emission of organic dyes. An academic visitor, Prof. Jaehong Kim (B. L. Weller Associate Prof. of Chemical & Energy Engineering, Yale University) visited ST3 in 11-15 Nov 2014. The visit fostered research collaboration on new nanomaterials for solar energy harvesting. Dennis Ng had collaboration with Dr. Energy A. Ermilov (BAM Federal Institute for Materials Research and Testing, Germany), who performed the photophysical measurements for the aza-BODIPY-based supramolecular complexes, and with Prof. Takumi Kinoshita (University of Tokyo), who studied the photovoltaic performance of the BODIPY-based sensitizers. Dennis Ng's group collaborated with Shunichi Fukuzumi of the Ewha Womans University and Meijo University in studying the photophysical properties of artificial photosynthetic models and Takumi Kinoshita of the University of Tokyo in studying the device performance of the new near-infrared dyes. D. Y. Xu and N. Zhao has been working together to study thermal properties of perovskite thin films in order to address the issues of thermal stability and heat dissipation for its application in solar cells and LEDs. W. H. Liao's group has collaborated on energy harvesting with Center for Advanced Materials, Shenzhen Institutes of Advanced Technology (SIAT), Chinese Academy of Sciences. **(ST4)** C. P. Wong has collaborated with Baohua Li at Graduate School at Shenzhen, Tsinghua University. Li's group have gained a lot of experience in the preparation and characterization of new carbon materials, which include graphene, carbon nanorube, natural graphite, porous carbon, etc., and their applications in energy storage devices (e.g.,

supercapacitor, lithium ion battery, sodium ion battery, fuel cell). He has taken on various research projects, financially supported by the "863" High Technology Programs, the National Science Foundation of China, Shenzhen Technological Plan, etc. His laboratory has cooperated with international institutes and corporations to develop carbon science and technology, and made numerous contributions. Therefore, this collaboration combined the strength of both sides to promote the progress of the project. **(ST5)** The group had research collaborations with Profs. Sid Chau (Masdar Institute of Technology), Xiaojun Lin (Purdue University) and Z. Xu (PolyU, HK)) on energy generation scheduling in microgrids; Prof. Lin (Purdue University) on optimal peak-minimized EV charging algorithm; Prof. Ramesh Sitaraman (University of Massachusetts) on optimal energy procurement for data center microgrid – data centers with on-site power production; Prof. Haibo Zeng (McGrill University) on online algorithm for automotive idling reduction; Prof. Qi Zhu (University of California – Riverside) on online algorithm for peak-aware economic dispatching in microgrids. Profs. Guanglin Zhang (Donghua University), Longbo Huang (Tsinghua University) and Haibo Zeng (Virginia Tech) on online energy management strategy design for hybrid vehicles; Profs. Hamed Mohsenian-Rad (University of California, Riverside) and Xiaojun Lin (Purdue University) on joint load balancing and demand response of data centers; Prof. Wei Yuan (Huazhong University of Science and Technology) on electrical vehicle charging; Profs. Yuan Wu and Liping Qian (Zhejiang University of Technology) on demand side management for microgrids; Prof. Steven Low (California Institute of Technology) on energy storage systems for primary frequency control, and China Light Power (CLP) on privacy in smart meter systems. More specifically, M. H. Chen had collaborations with Masdar Institute of Technology (on energy management in microgrids), Purdue University (on online EV-charging with peak-charging taken into account), Caltech (on EV battery swapping), Johns Hopkins University (on online demand response), and Tsinghua University (on electricity markets); Angela Zhang co-authored with colleagues in Caltech on optimal BESS control for fast frequency regulation; J. W. Huang had collaborations with University of Washington, Purdue University, and University of British Columbia on the related journal and conference publications; D. M. Chiu served on the Campus Environment and Sustainability Committee of LWS College at CUHK, to help oversee the various projects for green campus. The projects included (1) design of incentive schemes for students to save energy in dormitory rooms and public areas; (2) deployment of a commercial Building Energy Management system to monitor energy usage; (3) installation of renewable energy and storage components. **(ST6)** Z. Xu hosted a seminar by Prof. Vladimiro Miranda (Professor in the area of Power Systems, and President of INESC P&D Brasil, São Paulo, Brazil) entitled "Seeing events in 2D pictures with deep learning applied to visual cortex neural architectures: a tool of the future for power system control centers" on 14 Sep 2017. Z. Xu hosted a visit to Zhejiang University, China on 19-21 June 2014, where a large scale microgrid project was in progress, and Prof. Kehuan Zhang sent his student to join it. S. C. Wong joined this trip as well. Z. Xu also visited Shanghai Electric Power University, China on Sep. 22-24, 2014, where a campus microgrid system was developed. David Hill and Z. Y. Dong gave seminars in the Dept of Electrical Engineering at HK PolyU on 28 Feb 2014, entitled “Power system stability and control in a smart grid environment”. Z. Xu was the facilitator of the event. He also participated in another seminar by Dr. Jianhui Wang (Argonne National Laboratory, U.S.A), entitled “Smart Grid Research at Argonne National Laboratory” on 26 May 2014, hosted by Prof. J. W. Huang. In collaboration with the Hong Kong Observatory (HKO), the team developed high-performing granular probabilistic forecasting technology. This technology has been successfully implemented in the short-term probabilistic forecasting of the solar irradiance data of King’s Park at the HKO, and is applicable to solar and other renewable energies in future.

6.6 Research students trained (registration/awards):

72 PhD students and 5 MPhil students were associated with this Project and trained accordingly. More details are listed in Appendix 3.

ST	Name of students	Degree registered for	Date of registration	Dates of thesis submission/ graduation	Supervisor
	Please see Appendix 3				

6.7 Specific products (e.g. software or netware, instruments or equipment developed):

(ST5) J. W. Huang's group provided the Hong Kong solar and wind energy data (processed scenarios) to the research community: http://jianwei.ie.cuhk.edu.hk/energy.html. D. M. Chiu and his team proposed to develop a mobile app (with LWS college) to let student keep track of electricity usage, with more features, even push/recommendation. Smart building data collection, visualization and policy management platform. **(ST6)** A software package for demonstration of probabilistic prognosis of renewable energies (wind and solar), and a software package for demonstration of smart demand control were developed and demonstrated.

6.8 Other education activities and/or training programmes developed:

There exists an established energy engineering program (BEng (Hons) Degrees (Full Time) at CUHK since 2012, which is accredited by Hong Kong Intuition of Engineers. Several CUHK Co-PIs and Co-Is had involved in the taught courses associated with the program, with a student intake over 30. N. Zhao taught EEEN4020/ENER4020 entitled "Solar Energy and Photovoltaic Technology" in 2015-2018. Y. C. Lu and M. H. Chen co-taught ENER4040 entitled "Energy Storage and Distribution" in 2015. Y. C. Yu taught ENER4050/ESTR4422 entitled "Energy Storage Devices and Systems" in 2015-2018, from which Yu also received CUHK University Education Award (2016). M. H. Chen taught ENER4060 entitled "Energy Distribution" in 2016. Y. C. Yu taught EEEN/ENER3030 entitled "Engineering Materials" in 2014-2018, from which Yu also received Dean's Exemplary Teaching Award (2014). D. Y. Xu taught MAEG2030 entitled "Thermodynamics" in 2014-2018; MAEG4030 entitled "Heat Transfer" in 2014-2018; MAEG3030 entitled "Fluid Mechanics" in 2017. Meanwhile ST5 subgroup hosted monthly lunch gatherings to serve as a venue for students and professors to learn on recent energy-related research results, background on energy systems, and discuss energy related topics/issues. The talk information (with slides, granted speaker's permission) were documented at https://staff.ie.cuhk.edu.hk/~mhchen/energy_bema/. ST5 also developed a 10 KVA Microgrid Lab for teaching and research through this TRS project. D. M. Chiu developed a group-based energy usage feedback system and energy savings competition for university students. In the HK PolyU, there exists another program on electrical engineering with power electronics and power system. Z. Xu taught several major courses related to energy engineering, namely EE501 entitled "Alternative Energy Technologies"; EE461 entitled "Energy Efficient Design"; EE360 entitled "Fundamentals of Sustainable Energy Systems"; EE570 entitled "Design and Analysis of Smart Grids", and EE3004 entitled "Power Transmission and Distribution" in 2014-2018.

6.9 Please highlight any deliverables indicated in the project implementation timetable endorsed by the RGC which have not been covered or achieved as per Sections 6.1 to 6.8 above, and explain/ elaborate.

N. A.

Project Management

6.10 Please elaborate how the PC has played his/her role in coordinating and managing the project.

Prof. C. P. Wong (PC of this TRS project from 1 Jan 2014 to 31 July 2018) chaired all management and technical meetings of the project, and provided technical advices to the project team members in carrying out their research activities, as well as stimulating intergroup synergy of their research. In addition, he monitored the project progress and facilitated project liaisons with external industry partners from time to time. Meanwhile, he supervised the overall management and budgetary functions of the project and invitation of globally renowned visitors for various visits and meetings. Prof. J. B. Xu (serving as an Interim PC of this TRS project from 1 Aug to 31 Dec 2019) succeeded PC's role by providing administrative and technical coordination to the project team members, monitoring project progress and completion, supervising the overall management and budgetary functions of the project, as well as formulating and finalizing the completion report. A full-time Project Manager (PM,

from 1 May 2014 to 31 July 2018) was deployed for actively following up the project closely.

7. Awards and Recognition

7.1 Have any research grants been awarded that are directly attributable to the results obtained from this project?

The team members have secured numerous grants directly attributable to the research outcomes obtained from this project. Below is a summary of the grants secured in the period of 2014-2018.

(ST1) X. D. Xiao, Principal Investigator, 2014, "Energy band alignment at grain boundaries and its effects on the photovoltaic performance: A scanning probe microscopy study of CZTS thin film", GRF14306014, HK$673,646, Jan. 2015-Dec. 2017. X. D. Xiao, Principal Investigator, 2016, "Down-conversion Luminescence Layer for Thin Film Cu(InGa)Se_2 Solar Cells", GRF14315616, HK$540,824, Jan. 2017-Dec. 2019. X. D. Xiao, Principal Investigator, 2018, "Strategies to enhance Cu_2ZnSnS_4-based thin film solar cells by cation substitution", GRF 14301318, HK$505,298, Jan. 2019-Dec. 2021. X. D. Xiao, Project Coordinator, "Strengthening Thin Film Solar Cell Research: Facility Upgrade and Research Enhancement in Cu-based Chalcopyrite and Kesterite Solar Cells", Joint Research Laboratory Funding Scheme (JLFS/P-406/18), Joint Laboratory for Photovoltaic and Solar Energy (Jan. 2020-Dec. 2021). X. D. Xiao, Principal Investigator, 2018, "Recipes and Deposition Methods of Environmental Friendly Alternative Buffer Layer in Highly Efficient Cu(InGa)Se_2 Solar Cells ", ITF (Innovation and Technology Support Programme) ITS/249/17FP HK$3,600,000, Apr. 2018 – Mar. 2020. X. H. Lu, Principal Investigator, 2016, "In-situ Synchrotron Studies on Crystallization and Film Formation of Organic and Inorganic Halide Perovskite Solar Cells", GRF14314216, HK$ 540,824, Jan. 2017-Dec. 2019. X. H. Lu, Principal Investigator, 2019, "Correlating Three-dimensional Film Morphology with Solution Morphology Towards High-Efficiency Organic Solar Cells", GRF14303519, HK$558,272, Jan. 2020-Dec. 2022. X. H. Lu, Principal Investigator, 2017, "Comprehensive Morphology Studies of Organic Solar Cell with Non-fullerene Acceptors", N_CUHK418/17, HK$1,250,000, Jan. 2018-Dec. 2022.

(ST2) H. Yan, Principal Investigator, 2018, "Understanding and Improving the Stability of Organic Photovoltaics - Towards a Low-Cost and Commercially Viable Photovoltaic Technology", Research Impact Fund, R6021-18, HK$6,650,000, 2019-2021. N. Zhao, Principal Investigator, 2017, "Material and Interface Engineering for High-Efficiency Perovskite Solar Cells with Long-Term Stability", GRF14210917, HK$600,000, Jan. 18–Dec.2020. H. Yan, Principal Investigator, 2015, "Development of High-Performance Donor Polymers with Various Optical Bandgaps and Color Properties", GRF16305915, HK$706,972, Jan. 2016-Dec. 2018. H. Yan, Principal Investigator, 2016, "Organic solar cells based on Non-Fullerene Molecular Acceptors - Material design, synthesis and device and morphology study", GRF16322416, HK$540,824, Jan. 2017-Dec. 2019. H. Yan, Principal Investigator, 2017, "Controlling Morphology and Improving Performance for Ternary Organic Solar Cells based on Donor Polymers with Strong Temperature Dependent Aggregation Properties", GRF16303917, HK$784,347, Jan. 2018-Dec. 2019. H. Yan, Principal Investigator, 2018, "Material Design and Device Engineering for Non-Fullerene Tandem Organic Solar Cells", GRF16309218, HK$505,298, Jan. 2019-Dec. 2021. H. Yan, Principal Investigator, 2019, "Develop efficient and stable organic solar cells via bilayer sequential processing method assisted by donor polymers with temperature dependent aggregation properties", GRF16310019, HK$ 558,272, Jan. 2020-Jun. 2022. H. Yan, Principal Investigator, 2018, "Develop Low-cost and Environmentally Friendly Materials and Processes for Organic Solar Cells that Do Not Contain any Fullerenes", ITF (Innovation and Technology Support Programme) ITS/083/15, HK$1,382,000, July 2016 – Dec. 2017. H. Yan, Principal Investigator, 2018, "Development of Efficient Indoor Organic Photovoltaics based on Non-Fullerene Acceptors for IoT Applications", ITF (Innovation and Technology Support Programme) ITS/471/18, HK$1,400,000, Apr. 2019 – Sep. 2020. S. C. Chen, Principal Investigator, 2014, "Development of a Vacuum Nanoimprinting System for Low-cost Parallel Nanomanufacturing", ITF (Innovation and Technology Support Programme) ITS/129/14, HK$1,382,000, Oct. 2014 – Mar. 2016.

(ST4) Y. C. Lu, Co-Principal Investigator, 2017, "Creation of Rechargeable Electron-fuels for Stationary Power Supplies and Electric Vehicles", RGC, Theme-based Research Scheme T23-

601/17-R, HK$ 50,000,000, Jan. 2018–Dec. 2022. Y. C. Lu, Principal Investigator, 2014, "Elucidating the Design Principles of Carbide/Nitride-Based Lithium-Oxygen Electrodes: From Model Electrodes to Battery Application", GRF24200414, HK$831,737, Jan. 2015–Dec. 2017. Y. C. Lu, Principal Investigator, 2015, Y. C. Lu, Principal Investigator, 2015 "Probing the Working Mechanism of Peroxide Oxidation Catalysis in Lithium-Oxygen Batteries", GRF14200615, HK$871,044, Jan. 16–Dec. 2018, Y. C. Lu, Principal Investigator, 2017, "Model System Investigations of Solid-State Lithium-Oxygen Cathode-Electrolyte Interfaces: Reaction Kinetics, Electrode Reactivity and Degradation Mechanism", GRF14207517, HK$522,898, Jan. 18–Dec. 2020, Y. C. Lu, Principal Investigator, 2018, GRF14307318, HK$505,298, "Probing the Degradation Mechanisms of Water-in-Salt Aqueous Lithium-Ion Batteries using Model Electrode-Electrolyte Systems", Jan. 2019–Dec. 2021. Y. C. Lu, Principal Investigator, 2019, "Electrode-Electrolyte Design and Degradation Mechanism of Potassium-Oxygen Batteries: Reaction Kinetics, Product Morphology and Cell Reversibility", GRF14307919, HK$558,272, Jan. 2020–Dec. 2022. Y. C. Lu, Principal Investigator, 2018, "Development of a High-energy-density Flow Battery for Fast-refueling in Electric Vehicles (Evs)", ITF ITS/063/18, HK$1,400,000, Jan. 2018 - Jun. 2019.
(ST5) Angela Zhang, Principal Investigator, 2015, "Primary Frequency Control by Battery Energy Storage Systems", GRF14200315, HK$ 696,029, Jan. 2016-Dec. 2018.
(ST6) Z. Xu, Principal Investigator, 2016, "Leveraging Granular Analytics for Short-Term Probabilistic Prognosis of Renewable Generation", GRF1524431, HK$675,647, Jan. 2017-Dec. 2019. David Hill, Project Coordinator, 2014, "Sustainable Power Delivery Structures for High Renewables", Theme-based Research Scheme, HK$ 47.12M, Jan. 2015-Dec. 2019.

7.2 Have any project team members participated as invited speakers in or organisers of international conferences as a result of this project?

Information of 89 international conference presentations or conference papers associated with the project were provided in Appendix 3. Information of other lectures and organisation of international conferences that may not covered there is listed below.
(ST1) X. D. Xiao delivered a Keynote Speech at *China Photovoltaic Technology International Conference*, Xi'an, China, March 29- April 1, 2017; an invited at *International CIGS Workshop IW-CIGS Technology 8*, 30 May 2017, ZSW, Stuttgart, Germany; an invited talk at *The 29th International Conference on Photovoltaic Science and Engineering*, Nov. 4-8, 2019, Xi'an, China; serves as Member of International Scientific Committee of *The 11th International Workshop on CIGS Solar Cell Technology*, June 22-23, 2021, Berlin, Germany.
(ST2) J. B, Xu served as Discussion Leader, Gordon Research Conference: *Pathways for Solar Energy Conversion and Storage: Electricity, Thermal and Fuel*, June 17-22, 2018, HKUST, Hong Kong, https://www.grc.org/solar-energy-conversion-conference/2018/; the Local Organizing Committee and Henry Yan served as the Co-Chair of the *13th International Symposium on Functional π-Electron Systems* (*Fπ-13*), June 4 – 9, 2017, Hong Kong University of Science and Technology, Hong Kong, China. He also served as the Vice Chairs of the *Gordon Research Conference: Hybrid Electronic and Photonic Materials and Phenomena - Electronic and Photonic Processes and Interfacial Phenomena in Organic/Inorganic Hybrid Materials and Their Applications in Optoelectronic Devices,* 10 - 15 June, 2018, Hong Kong, China; He and Henry served as Co-Chairs of *International Symposium on Organic Photovoltaic Materials and Devices*, March 5-7, 2016, The Hong Kong University of Science and Technology; with Plenary Speakers including Prof. Alan Heeger, Noble Prize Laureate, http://ias.ust.hk; and Prof. C. W. Tang, Wolf Prize Laureate. N. Zhao has delivered several talks, e.g., "$HPbI_3$: A new precursor compound for high efficiency solution-processed perovskite solar cells" at *Material Research Society*, (Fall Meeting, Nov 30 - Dec 5 2014; Spring Meeting, April 6-10, 2015); "Molecular packing & electronic processes in amorphous polymer bulk heterojunction solar cells with fullerene intercalation" (*4th Molecular Materials Meeting*, Singapore, 2014) and "Perovskite energy materials and devices" (ETH Zurich, Switzerland, May 15 2014; Workshop of Peking University, Apr. 3, 2015; Zhejiang University, China, July 10, 2015). Tao Chen gave two invited talks: "Engineering Nanostructured Materials for Organic/Inorganic Hybrid Solar Cells" in *Progress in Electromagnetics Research Symposium 2014 in Guangzhou* (August 25–28, 2014); "Reaction Pathway for the formation of $CH_3NH_3PbI_{3-x}Cl_x$ Perovskite Absorber Materials and the Application in Inverted Device Structure" at *The 29th Annual Conference of Chinese Chemical Society* "中國化學會第 29 屆學術年會" (Aug. 4–7, 2014, Beijing). S. C. Chen had three presentations titled "A flexure-based roll-to-roll machine for fabricating flexible

photonic devices" at *The 29th Annual Meeting of the American Society for Precision Engineering*, (Nov. 9-14, 2014, Boston, MA, USA); "Low cost parallel manufacturing processes for fabricating photonic devices" at 2014 *International Symposium on Optomechatronic Technologies* (ISOT) (Nov. 5-7, 2014, Seattle, USA) and "Precision roll-to-roll machine design for large area metal patterning at nanometer resolution" (Dept. of Power Mechanical Engineering, *National Tsing Hua University*, Taiwan, July 28, 2014).

(ST3) J. C. Yu gave an invited talk titled "Designing Wide Spectrum Responsive Nanomaterials for Photocatalysis," at *The 11th Cross-Strait Workshop on Nanoscience and Technology*, Hong Kong, Dec. 14-18, 2014; J. C. Yu served on the Organizing Committee of *The 2nd International Conference on Catalysis and Chemical Engineering*, Paris, France, Feb. 19-21, 2018.

(ST4) C. P. Wong delivered invited speech "High-performance perovskite solar cells" at State Key Laboratory of Crystal Materials of, Shandong University, China (30 June 2018); Keynote Speeches at several international conferences, namely, "It's a small world after all: Recent advances on nano-materials and technologies for advanced electronic, photonics and MEMS applications", *International Union of Materials Research Societies – International Conference on Electronic Materials 2014* (June 10-14, 2014, Taipei); "Development of Metal-Assisted Chemical Etching of Silicon as a 3D Silicon TSV Nanofabrication Platform" at *International Conference on Electronic Packaging Technology (ICEPT) 2014* (Aug 12-15, 2014, Chengdu, China). Y. C. Lu gave several invited lectures and visited various collaborators in Feb. 2014 – Jun. 2015, namely, Prof. Gasteiger (Chair of Technical Electrochemistry (TEC), Technische Universität München (TUM)); industrial partner ATL; The *5th AEARU advanced Materials Workshop* at the HKUST; Prof. Jean-Marie Tarascon (Chemistry Institute of Collège de France); Prof. B. J. Huang (Sustainable Energy Development Center, National Taiwan University of Science and Technology (NTUST)); Prof. Peng and Prof. Chuang (Dept of Physics, Tamkang University); Dr. L. C. Chen (Distinguished Fellow and Director, Condensed Matter Sciences (CCMS)), National Taiwan University (NTU)); Dr. Dong (National Synchrotron Radiation Research Center (NSRRC). Y. C. Lu also invited Prof. Jean-Marie Tarascon (Chair of Chemistry of Materials and Energy, Collège de France) to give Keynote Speech at CUHK on Aug 2014. Y. C. Lu, gave a Plenary Lecture entitled "*Pathways to High-Energy-Density Redox Flow Batteries*", Winter School, Chair of Technical Electrochemistry, Technische Universität München, March 09, 2016, Austria.

(ST5) M. H. Chen gave an Invited Talk entitled "Impact of the Uncertainty of Distributed Renewable Generation on Deregulated Electricity Supply Chain" on the *IAS Workshop on* "*Decision and Control in Smart Power Networks*", Institute of Advanced Study, HKUST, Jan 2017; Invited Talk "Second Chance Works out Better: Saving More for Data Center Operator in Open Energy Market" at CISS 2016, Princeton University, USA, March, 2016; served as Senior Member of Topic Program Committee for *ACM e-Energy 2015*, Topic Program Committee Co-Chair of *ACM e-Energy 2016*, General Chair of *ACM e-Energy 2017*. Angela Zhang served as Topic Program Committee Co-Chair, *IEEE SmartgridComm 2017*, *Symposium on Communications and Networks to Enable the Smart Grid*, Chair of *IEEE ComSoc Emerging Technical Committee of Smart Grid Communications* (terms of service: 1 Nov. 2017 – 30 Oct. 2019). The goal of the Committee was to provide technical support to the IEEE Smart Grid Initiative and secure ComSoc's position in the development and promotion of Smart Grid related technologies, and particularly, in Smart Grid Communications. The activities included conferences and journal publications, standardization and policies, industry outreach programs, academic curriculum development, realization of an IEEE ComSoc Smart Grid portal. J. W. Huang: Served as the Leading Symposium Co-Chair of *IEEE SmartGridComm 2014 Demand Response and Dynamic Pricing Symposium* (3-6 Nov. 2014, Venice, Italy. Conference website: http://sgc2014.ieee-smartgridcomm.org). The conference is a premium conference in the area of smart grid, with around 270 attendees this year. *The Demand Response and Dynamic Pricing Symposium* is the largest symposium in this conference. ACM e-Energy is organized by ACM SIGCOMM, and according to the website "it aims to be the premier venue for researchers working in the broad areas of computing and communication for smart energy systems, and in energy-efficient computing and communication systems". D. M. Chiu served as panellist at *e-Energy 2017*, in a panel on Data Analytics in Smart and Energy-Efficient Buildings.

(ST6) Z. Xu served as Co-Chair of *Control and Operation for Smart Grids, Microgrids and Distributed Resources Symposium*, *2016 IEEE International Conference on Smart Grid Communications*, Nov. 06 - 09, 2016 Sydney, Australia; Special Session Chair, *Emerging Techniques for System Security and Market Management in Smart Grids*; Keynote Speaker,

International Workshop on Renewable Energy and Smart Grid, Shanghai University of Electric Power, 8-12 July 2016.

7.3 Have any project team members taken leadership positions in editorial boards, scientific and professional organisations?

The TRS project team members are proactively participated in various academic and professional positions. Here is a summary of the related positions recorded for documentation. **(ST1)** X. D. Xiao served as Member of Enterprise Support Scheme (ESS) Assessment Panel, Innovation and Technology Fund, Hong Kong SAR Government, 1 July 2017 to 30 June 2019; Panel Member of Integrated CIGS Project, China Shenhua Group (神華集團), since 2017. **(ST2)** J. B. Xu has served as Associate Editor in Engineering Sciences Category of *Science Bulletin* since 2018, a major multi-disciplinary journal in the mainland China, also as Member of Editorial Board of *npj 2D Materials and Application* (Nature Partnership Journal) from Jan. 2017. N. Zhao has served in the Editorial Board of *Scientific Reports* (Nature Publication Group), under the Division of "Electronics, Photonics and Device Physics". **(ST3)** Jimmy Yu has been (1) Associate Editor, *Journal of Nanoparticle Research* (2009-present); (2) Editorial Advisory Board, *Langmuir* (2012-present); (3) Editorial Advisory Board, *Advanced Materials Interfaces* (2013-present); (4) Editorial Board, *Rare Metals* (2007-present); (5) Editorial Board, *Environmental Chemistry* (2004-present); and (6) Editorial Board, *International Journal of Photoenergy* (2001-2014). J. F. Wang has been (1) Advisory Board of *Nanoscale Horizons* (04/2015-present); (2) Editorial Board of *Scientific Reports* (03/2014-present) (3) Editorial Advisory Board of *Advanced Optical Materials* (01/2012-present) and (4) Associate Editor of *Nanoscale* (09/2009-12/2019); (5) Advisory Board Member for *Nanoscale Horizons*, *Nanotechnology*, *ChemPlusChem*, *Advanced Optical Materials*. W. H. Liao has been (1) Associate Editor, *Journal of Intelligent Material Systems and Structures* (2009–present); (2) Associate Editor, *Smart Materials and Structures* (2008-present); (3) Conference Chair, Active and Passive Smart Structures and Integrated Systems, *SPIE Smart Structures/NDE* (2014 and 2015). **(ST4)** C. P. Wong has served as the Editorial Board Member of *Nano Energy* (2012-present). Y. C. Lu has served as an Editorial Board Member for *Scientific Reports* (Nature Publishing Group) (04/2014–present). **(ST5)** M. H. Chen has served as Editor, *IEEE/ACM Transactions on Networking*; Steering Committee of *ACM e-Energy*. Angela Zhang has served as Executive Editor of *IEEE Transactions on Wireless Communications* (2014-present); Editor of *IEEE Transactions on Communications* (2012-present). J. W. Huang has served as Editor of *IEEE Transactions on Mobile Computing*; Editor of *IEEE/ACM Transactions on Networking*; Editor *of IEEE Transactions on Network Science and Engineering*; Editor of *IEEE Transactions on Cognitive Communications and Networking*; Series Editor of *Wiley Information and Communication Technology Series*; Area Editor of *Springer Encyclopaedia of Wireless Networks*; Section Editor of *Springer Handbook of Cognitive Radio*; Guest Editor of *IEEE Journal on Selected Areas in Communications*, a special issue on "*Game Theory for Networks*"; Guest Editor of a special issue of "*Big Data Analytics of Grid Modernization*" of *IEEE Transactions on Smart Grid*. This is a prestigious journal with an impact factor of 4.252, ranks 9/249 in the category of Engineering, Electrical & Electronic by SCI. D. M. Chiu served as Hong Kong RGC Engineering Panel for GRF and Joint Panel for NSFC/RGC grants (2013-16); Hong Kong ITC (ITSP, ASTRI, and ESS) Vetting Panels (2015-18). **(ST6)** Z. Xu has been promoted to Full Professorship at The Hong Kong Polytechnic University since 1 July 2017 and he has become Chairman of IEEE Hong Kong Joint Chapter of IES/PES/IAS/PELS since Feb 2017. His other leadership positions include: Editor of *IEEE Transactions on Smart Grid*, since Oct 2015; Editor of *IEEE Power Engineering Letter* for *IEEE PES Transactions on Power Systems*, *Power Delivery*, *Power Conversion*, *Smart Grids and Sustainable Energy*, since July 2014, which are the best journals in power engineering and smart grid field. IEEE Power and Energy Society sponsors or co-sponsors six peer-reviewed technical journals, and only the highest-quality papers are considered for publication. Acceptance rates are generally as stringent as only 10–15%. He has also served as Editor of *Electric Power Components and Systems Journal*, published by Taylor & Francis; Associate Editor of *Springer International Journal of Modern Power Systems and Clean Energy* since 2016; Editorial Board Member of *Springer International Journal of Modern Power Systems and Clean Energy*, (China's first English journal on power system by State Grids of China Corporation) since 2013; Guest Editor of *IEEE Transactions on Industrial Informatics*, in Special Section on Emerging Informatics for Risk Hedging and Decision Making in Smart Grids, August, 2016; Guest of Editor-in-Chief,

Special Session on "*Modern Optimization Techniques for Power System Operation and Planning*", in Springer International *Journal of Modern Power Systems and Clean Energy*, 2014; Guest Editor of Special Session on "*Microgrids*", Springer International *Journal of Modern Power Systems and Clean Energy*, 2014.

7.4 Any documentary proof of the application of technologies arising directly from this project?

There are 11 patents filed. Among them 7 are granted. Following are the highlights. **(ST1)** X. D. Xiao, "Novel design of barrier layers for deposition of CIGS thin film solar cells on metallic substrates" (CN201410203029.X); XD Xiao, "System and Method for Laser Scribing a Solar Panel and the Solar Panel" (US 15/455376; CN201710141357.5). **(ST2)** S. C. Chen, "Roll-To-Roll Printing Systems and Methods for Fabricating Print Roller" (US14/057,320). **(ST3)** Jimmy Yu, "Photocatalytic CoP_2-loaded Red Phosphorus for H_2 Formation from Water" (US8,940,656) His group also filed a Chinese patent application about Heterostructure of Red Phosphorus and Black Phosphorus (Application No. 201510224181.0) J. F. Wang, "Converting infrared light into visible light using lanthanide-sensitized oxides" (US14/279,128). D. Y. Xu, "Methods of fabrication of flexible micro-thermoelectric generators" (US2017/0345989). **(ST4)** Y. C. Lu, "High-Energy-Density and Low-Cost Flow Electrochemical Devices" (US15/371,466; CT/CN2016/109055; CN201680002631.4). **(ST5)** M. H. Chen, Energy-Efficient Operation of Heavy-duty Truck (US 15/622,742). **(ST6)** Z. Xu, Granular Predictor for Probabilistic Intervals Construction (CN201610537237.2)

7.5 Other awards and recognitions as a result of this project (please specify):

There are numerous awards and recognitions received by the TRS project members. Below are some of highlights.
(ST1) X. H. Lu has been awarded Hong Kong SAR Research Grants Council Early Carrere Scheme Award (2018) with the project entitled "*Heterovalent Doping of Halide Perovskite Nanocrystals for Versatile Optoelectronic Devices*" (Grant No. 24306318).
(ST2) J. B. Xu has been elevated to the IEEE Fellow for his contribution to electronic materials and devices (https://eds.ieee.org/images/files/Awards/2018_EDS_Fellows.pdf, effective from 1 Jan 2018). N. Zhao and C. P. Wong were named by Clarivate Analytics in the list of "*Highly Cited Researchers 2018*" as among the world's top researchers whose work has been highly cited by fellow academics and are hence making a significant impact in ongoing research in the field of materials science and engineering (https://www.cpr.cuhk.edu.hk/en/press_detail.php?id=2925&t=nine-cuhk–professors–named-most-highly-cited-researchers). J. B. Xu was honoured as Chang Jiang Scholar Chair Professor 2014 tenable at Nanjing University, Ministry of Education, China; Best Presentation Award at the China PV Technology International Conference (CPVTIC 2017), 31 Mar 2017, Xi'an, China. Research team of N. Zhao received the Best Paper Award at *CU Energy Day 2014*, as well as the Best Poster Award at the Perovskite Solar Cells Session at the *2015 MRS Spring Meeting*. The paper "*Large-Grain Formamidinium $PbI_{3-x}Br_x$ for High-Performance Perovskite Solar Cells via Intermediate Halide Exchange*" (M. Z. Long, *et al.*, 2017) was selected by the *Advanced Energy Materials* as the cover page (Vol. 7(12), June 21, 2017, 1601882). The cover of *Advanced Energy Materials* is highly coveted. It is instantly recognisable and associated worldwide with the highest quality research from the top researchers in the field.
(ST3) J. F. Wang has been awarded as Senior Research Fellow by Croucher Foundation, honoured as the Recipient of the 31st Khwarizmi International Award (KIA) by the Iranian Research Organization for Science and Technology (IROST) for his outstanding research work on colloidal plasmonic metal nanocrystals in 2018 (http://ip.irost.org/kia/content/ khwarizmi-international-award-31st-session-2018). J. F. Wang and J. C. Yu were named by Clarivate Analytics in the list of "*Highly Cited Researchers 2018*" as among the world's top researchers whose work has been highly cited by fellow academics and are hence making a significant impact in ongoing research in the field of materials science. https://www.cpr.cuhk.edu.hk/en/press_detail.php?id=2925&t=nine-cuhk– professors–named-most-highly-cited-researchers
(ST4) C. P. Wong was named by CUHK as *Choh-Ming Li Professor of Electronic Engineering* 2013-17; http://www.ee.cuhk.edu.hk/en-gb/news-events/news/2012/335-prof- wong-c-p-

awarded-choh-ming-li-professorship; selected as a Web of Science *Highly Cited Researcher* (HCR) in Materials Science and Engineering in 2018 and 2019, respectively. Y. C. Lu has been awarded Hong Kong SAR Research Grants Council Early Carrere Scheme Award (2014) with the project entitled "*Elucidating the Design Principles of Carbide/Nitride-Based Lithium-Oxygen Electrodes: From Model Electrodes to Battery Application*"; CUHK Young Researcher Award (2016); and Outstanding Young Researcher Award with a project entitled "*Electrochemical Energy Storage and Materials Interface Science*" by National Science Foundation of China (2019).

(ST5) Angelia Zhang has been elected as IEEE Fellow for contributions to resource allocation and optimization in wireless communications (https://www.comsoc.org/membership/ieee-fellows/2020, effective from Jan 2020); selected as the IEEE Communications Society Distinguished Lecturer of 2018-2019 (https://www.comsoc.org/membership/distinguished-lecturers). She also served as a Member of Technical Committee of Smart Grid Communication Committee (https://sg.committees.comsoc.org/officers/). The IEEE Communications Society (ComSoc) is a leading global community comprised of a diverse group of industry professionals with a common interest in advancing all communications and networking-related topics. She was also elected as the *Chair of IEEE Communication Society Emerging Technical Committee* of Smart Grid Communications (terms of service 1 Nov. 2017–30 Oct. 2019). The goal of the committee was to provide technical support to the IEEE Smart Grid Initiative and secure Communication Society's position in the development and promotion of Smart Grid related technologies, and particularly, in Smart Grid Communications. The activities included conferences and journal publications, standardization and policies, industry outreach programs, academic curriculum development, realization of an IEEE ComSoc Smart Grid portal. M. H. Chen's paper on online algorithm for energy efficient crowdsourced demand response was selected as a Best Paper Award Candidate on ACM e-Energy 2016 (3 in total); Paper on energy-efficient trucking was also a Best Paper Award Candidate on ACM e-Energy 2016 (3 in total); received ACM Recognition of Service Award, 2017, for contribution to research community, in particular for serving as General Chair of ACM e-Energy 2017; his paper on energy-efficient trucking with multiple tasks in consideration was selected a Best Paper Award candidates on ACM e-Energy 2018 (5 in total); his student's work on energy general scheduling won a CUHK Faculty of Engineering *Outstanding MPhil Thesis Award* in 2014. (Lu Lian, a student under supervision by M. H. Chen). J. W Huang was selected as a Web of Science *Highly Cited Researcher* (HCR) in Computer Science in 2016 and 2017, respectively. The awards meant that his research has ranked among the top 1% most cited works in the field of Computer Science based on his past high impact research papers, including those on smart grid economics. His paper published in IEEE ICC 2017 was recognized as a Best Paper Award Finalist. He was honoured as IEEE Communications Society Distinguished Lecturer, 2015–2018, with a renewed second term of the Distinguished Lecturer, due to his past research record and invited talk record, including those related to smart grid economics. D. M. Chiu's work on the detailed analysis of current energy usage with LWS College at CUHK led to the Silver Award in the GREENPLUS recognition Award 2014 by China Light Power (CLP) HK Ltd., a local major electric utility corporation.

(ST6) PhD Student of Z. Xu, Mr. Xu Xu, was awarded the "Best Student Paper Award" at *The IEEE 2018 International Conference on Innovativ+e Smart Grid Technologies Asia* in Singapore, for his paper entitled "Optimal Placement of Voltage Regulation for Photovoltaic Hosting Capacity Maximization". This international conference is one of the IEEE Power and Energy Society (PES) flagship conferences, held on 22-25 May, 2018 in Singapore. The award was the only one among more than 70 student papers presented at the conference. One of Xu's projects entitled as "Optimization and Control Theory of Flexible Resources on the Demand Side of New Energy Power System"「新能源電力系統需求側靈活資源的優化與控制理論」was awarded the First Class Award of The Outstanding Research Outputs (Science and Technology) by the Ministry of Education dated on 1 Dec. 2017 「2017 年度高等學校科學研究優秀成果獎（科學技術）」一等獎. The conference paper entitled "Impacts of Large-scale Photovoltaic Generation Penetration on Power System Spinning Reserve Allocation" was selected as one of the Best Conference Papers submitted to the 2016 Power & Energy Society General Meeting, *IEEE Power and Energy Society General Meeting (PES)*, 2016, Boston, July, 2016. A heuristic optimal power flow algorithm developed by Xu's team was selected as one of the five best algorithms for solving the complicated optimal power flow problem in power system operation in the *IEEE Power & Energy Society General Meeting* (27-31 July 2014) in Washington DC, USA. The paper entitled "A Hybrid Approach for k-way Partitions in Smart

Grid based on Laplacian Spectrum and Self-Organizing Map" by a PhD student of Xu's group was awarded as Third Prize in *2014 IEEE Hong Kong Student Paper Contest*. Joe Dong has been elevated by to IEEE Fellow by the IEEE Board of Directors, for his contributions to development of computational methods for power system stability and planning (effective from 1 Jan 2017).

8. Impacts

8.1 What are the current and expected impacts of the project on the long-term development of Hong Kong (social or economic development, e.g. patent, technology transfer, collaboration with external organisations, etc.)?

There exist a few examples to show the impactful outcomes from this project, as described below. Several world records are achieved in terms of solar energy harvesting and storage.
(ST1) The full-set technology of fabricating efficient CIGS cells and modules by the team leads to a high-efficiency CIGS PV system in CUHK whose efficiency is ranked the highest PCE in the Greater China, as well as a start-up company "ShineTech Co Ltd." (旭科新能源股份有限公司, http://kjj.jiaxing.gov.cn/art/2019/7/1/art_1543227_23026715.html) in the Xiuzhou National High-Tech Zone, Jiaxing County, Zhejiang Province of China since 2015 (浙江省嘉興市秀洲區秀洲工業園區康和路嘉興光伏科創園 6 楼底楼东侧, http://big5.jobcn.com/position/company.xhtml?redirect=0&comId=568210&s=page/area&acType=2), with estimated capacity 2MW/year. The company currently has the first in China, the second in world production line of flexible CIGS thin film solar panels based on polyimide substrate. The company currently has 3,000m^2 clean room, 82 employees (20 of them have Master of Science or PhD degrees), and has been approved to build "Provincial Enterprise Research Institute" by Zhejing Province and "High-tech R&D Center" of Jiaxing County. In the field of CIGS solar cells, the R&D team achieved the third conversion efficiency in the world.
(ST2) Henry Yan's launched a start-up company "eFlexPV" (Website: https://eflexpv.com; https://www.hkstp.org/zh-hk/directory-list/Details/eflexpv-limited), which is commercializing their world-record efficiency organic thin film PV technology.
(ST4) The group have filed an US non-provisional patent application based on results rising from the project. They have been contacted by numerous private companies that have expressed strong interests in collaborating with them. In addition, they were contacted and visited by Environmental Protection Department (EPD) delegation and Hong Kong Productivity Council (HKPC) representatives expressing strong supports and interests in building collaboration to apply their technology for practical application (EV application). **(ST5)** The group have shown that the proposed online competitive optimization/analysis approach for microgrid management is suitable for addressing a key issue in microgrids, which is a viable solution for providing electricity in areas with heterogamous power quality requirements as well as various islands in Hong Kong that may not be able to obtain electricity from the main grid (due to economic reason). They have also applied a US patent on improving the energy efficiency of heavy-duty truck operation, which is a major contributor to green-house gas emission in the US, in the HK, and worldwide. M. H. Chen served as adviser of Convertergy Inc. (http://www.tsingcapital.com/index.php?c=article& id=191) and architected the first specialized wireless transmission protocol for roof-top/power-plant solar-panel monitoring systems. The overall solar panel monitoring and diagnosis system has been sold in China/Japan/Denmark. J. W. Huang has shown that his proposed analysis framework and algorithms are likely to make the microgrid operations more economically affordable, by significantly reducing the investment and operational costs and improving the system efficiency. D. M. Chiu has involved in a smart building project being part of the Smart City initiative by Hong Kong SAR Government. Energy conservation and reduction of carbon footprint is a goal for Hong Kong, as well as many world cities. His efforts in building software platform for smart buildings, and designing data analytic policies for encouraging energy conservation can be generally applied to many scenarios in Hong Kong. His team delivered talks to Electrical and Mechanical Services Department (EMSD), Hong Kong SAR Government, and will continue to transfer their knowledge and technology to practical use.
(ST6) In collaboration with the Hong Kong Observatory (HKO), the team have developed high-performance granular probabilistic forecasting technology. This technology has been

successfully implemented in the short-term probabilistic forecasting of the solar irradiance data of King's Park at the HKO, and is applicable to solar and other renewable energies in the future.

8.2 Others (please specify):
Other related activities are summarized in Appendices 8-10. They include
(1) Project Workshops, Exchange Visits, Public Lectures and Exhibitions
(2) Facilitation of Technology Transfer
(3) Other Publicity Activities

9. Sustainability of the Project

9.1 Whether there are new ideas evolved directly from this project?

There are a few new ideas evolved from this project, as described below, particularly in terms of solar energy harvesting, storage, and utilization.
(ST1) The CIGS team currently has the first in China, the second in world production line of flexible CIGS thin film solar panels based on polyimide substrate. **(ST2)** The group is the first team in the world to achieve single-junction organic solar cell with a record efficiency of 11.5%, which has been officially recognized as a major technological breakthrough in the renowned NREL Chart of "Best Research-Cell Efficiencies". The team is also the first one to develop nonstoichiometric acid-base reaction (NABR) to improve the intrinsic stability of $MAPbI_3$ perovskite up to two months, approximately 10 times longer than that prepared by traditional method. **(ST3)** The group is the first team in the world to discover two innovative photocatalytic materials: micro-fibrous red phosphorus as a photocatalyst to produce hydrogen from water at record-high efficiency, as well as the lanthanide-sensitized oxide which can convert infra-red light into visible light at record-high efficiency, as compared to their respective counterparts. **(ST4)** The group developed an innovative introduction of bromide ions as a replacement for the 'trapped' iodide ions (I^-) in redox flow batteries. The work leads to a high-energy-density zinc/iodine-bromide redox flow battery (ZIBB) which achieved the highest reported energy density for aqueous redox flow batteries to date (101 $W{\cdot}h{\cdot}L^{-1}$). **(ST5)** The team broke through the conventional prediction-based scheduling paradigm and proposed as well as developed an online algorithm called CHASE (Competitive Heuristic Algorithms for Scheduling Energy-generation), which is based on intelligent tracking of the behaviors of perfect dispatch. A lot of experimental evidences show that it is able to bring about remarkable 20% cost saving. They also devised an innovative highly-efficient algorithm solution for heavy-duty trucks which travel between two locations across the national highway system. The solution is able to reduce the truck's fuel consumption by up to 17% as compared to the common shortest/fastest path algorithm, provided that the deadline constraint is met. The group also helped build a smart online energy management platform, "Woo Sing Power", which provides instantaneous feedback to each room of a CUHK hostel to raise the awareness among the students of energy consumption and conservation and assists administrators to find opportunities and policies to save energy. **(ST6)** The team established the first-of-its-kind microgrid experimental laboratory platform in Hong Kong with total capacity of 4 kW - a holistic integration system comprising photovoltaics, energy storage and optimization dispatch components. They also invented a first-of-its-kind smart demand controller in HK enabling frequency/voltage response from various home appliances, as well as a high-performing granular probabilistic forecasting technology which has been successfully implemented in the short-term probabilistic forecasting of the solar irradiance data of King's Park at the Hong Kong Observatory.

9.2 Whether there are new projects evolved directly from this project?

There appear numerous new projects which have been developed directly from this project. A list of the related projects is collected in Section 7.1. A typical example for highlight is shown here. Henry H. Yan of **(ST2)** at HKUST has devised and developed a new strategy for organic photovoltaic materials having a near ideal polymer:fullerene morphology for high-performance OPV devices. This achievement is recognized as a major technological breakthrough in the renowned NREL Chart of "Best Research-Cell Efficiencies" for OPV devices. Meanwhile, his team have also discovered the temperature-dependent aggregation (TDA) behaviour of certain polymeric donor materials and utilized this phenomenon to fabricate high-performance organic solar cells. Thanks to his team's breakthroughs in OPV materials, he has secured a competitive research grant to further investigate OPV device stability and cost reduction, through newly

established RGC Impact Research Fund (RIF) (Grant No. R6021-18), entitled "Understanding and Improving the Stability of Organic Photovoltaics - Towards a Low-Cost and Commercially Viable Photovoltaic Technology". The objective of the RIF is to support universities to conduct more impactful and translational research projects which may assist in meeting Hong Kong's strategic and societal developments and foster more collaborative efforts with stakeholders beyond academia.
https://www.ugc.edu.hk/eng/rgc/funded_research/funding_results/rif/rif1819.html

9.3 Whether there are new collaborations developed directly from this project?

There emerge several new research collaborations which have been developed directly from this project. Below are two typical examples for deliberation. **(ST6)** The Co-I David J. Hill collaborated with Co-PI Z. Xu of ST6 as well as other colleagues at The University of Hong Kong (HKU); The Hong Kong Polytechnic University (PolyU), and The Hong Kong University of Science and Technology (HKUST) have secured a TRS project under the theme of Developing a Sustainable Environment, whose title is "Sustainable Power Delivery Structures for High Renewables", with PC - David J. Hill of (HKU) in 2014/2015 round. Z. Xu has been a Co-PI of the TRS project.
https://www.ugc.edu.hk/eng/rgc/funded_research/layman/theme/trs4_lay_sum.html#201_14
The project aims to addresses the sustainability of electrical power delivery systems for renewable energy technologies, particularly to determine the structure of the delivery systems. The major objectives include: (1) development of new paradigm which is adaptive in the sense of demand following generation; (2) load devices which contribute to overall balancing and welfare of the system in processes of demand response and load control; (3) future smart loads, using advanced power electronics, and the control and communication systems to be adaptive to the dynamically changing power generation and circumstances. If it operates successfully, it will establish Hong Kong as a central contributor in the vital area of sustainable electricity supply with benefits for the Greater China, which can support the future industry in the Pearl River Region and beyond.
(ST4) Co-I C. Y. Lu of CUHK has collaborated with Prof. T. S. Zhao of HKUST and other colleagues at HKU and PolyU, and successfully secured a TRS project under the theme of Developing a Sustainable Environment, whose title is "Creation of Rechargeable Electron-fuels for Stationary Power Supplies and Electric Vehicles", with PC: T. S. Zhao of (HKUST) in 2017/2018 round.
https://www.ugc.edu.hk/eng/rgc/funded_research/layman/theme/trs7_lay_sum.html#201_17
The project aims to address the challenges hindering the widespread use of renewable energy by developing a novel energy storage system that incorporates electrically rechargeable liquid fuels known as e-fuels. The major objectives include: (1) development of inexpensive and energy-dense e-fuels: (2) investigation of crosscutting characterization and diagnostics of cell operation and mitigation of performance-limiting factors; (3) multi-scale modelling to achieve the optimal cell design. Ultimately, this project will result in an electricity-fuel-electricity conversion system with unprecedented efficiencies exceeding 80%. The e-fuel storage technology offers an excellent solution not only for grid-scale and micro-grid energy storage, but also for off-grid and distributed energy system power supplies.

9.4 Please give details on how much money and from which sources has been obtained/requested for the specific purpose of continuing the work started under this project.

See Sections 9.2 and 9.3

10. Statistics on Research Outputs

(Please ensure the statistics in this section are consistent with the information presented in other sections of this report.)

	Peer-reviewed journal publications	Conference papers	Scholarly, books, monographs and chapters	Patents awarded	Other research outputs (please specify)	
					Type	No.
No. of outputs arising directly from this research project	296	89	2	7 granted/ 4 pending	Technology Exhibitions Showcasing project achievements in 12 technology exhibitions in the format of poster display, demonstra-tions and videos.	12

12. The Layman's Summary

(describe in layman's language the abstracts and research impact of the project.)

Harvesting, storing, and utilizing energy directly from sunlight by using photovoltaics (PV), photocatalysis, artificial photosynthesis, and other enabling technologies is a promising way to tackle and/or mitigate man-made global climate change. In this project we have achieved several significant advances in solar energy harvesting, storage, and utilization after collaborative efforts, namely: (1) Development and commercialization of high-performance flexible CIGS thin film solar panels. The technology provides the best conversion efficiency in the Greater China and the third conversion efficiency in the world in the field of CIGS solar cells. (2) Establishment of an interdisciplinary research platform for fundamental research of PV devices and exploration of solution-processed high-performance perovskite PV devices with a novel processing strategy and high stability. (3) Development and commercialization of a new class of organic photovoltaic materials having a record-high solar cell efficiency. (4) Exploration of several novel materials for photon-energy upconversion and photocatalytic hydrogen generation with record-high efficiencies. (5) Demonstration of record-high energy-density for a new class of liquid batteries having the highest energy density of its kind to date; and exploration of nanostructured electrode materials for high energy density supercapacitors for energy storage. (6) Development of online energy generation scheduling for microgrids apart from the conventional prediction-based scheduling paradigm, with an online algorithm called CHASE (Competitive Heuristic Algorithms for Scheduling Energy-generation). Meanwhile an energy saving scheme has been devised and implemented in a student hostel on CUHK campus. (7) Demonstration of Laboratory Microgrids developed and tested with commercially-available solar panels and available for demonstration with home-built solar panels, along with islanded and grid-interconnected implementations under the intelligent control system and advanced algorithm having secure and economic operation.

All of these aforementioned accomplishments are in line with the strategic objectives on sustainable development outlined by the Hong Kong Government in 2005, and have strengthened the competitive edge of Hong Kong in solar energy technologies and potential market penetration. All these will eventually impact on the substantial technology transfer of solar energy technologies and the utilization of renewable energy in Hong Kong and beyond.

Peer-Reviewed Journal Publication(s) Arising Directly from This Project (Section 6.4(a) of Main Report)

Symbol "#" is used to indicate publications involving inter-institutional collaborations.

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
ST1	1.1-4#	2016				Pei Cheng, Cenqi Yan, Tsz-Ki Lau, Jiangquan Mai, **Xinhui Lu*** & Xiaowei Zhan*	Molecular lock: A versatile key to enhance efficiency and stability of organic solar cells. *Adv. Mat, 28*(28): 5822 - 9. DOI: 10.1002/adma.201600426	2017	Yes	Yes	Yes
	1.2-4#	2017				Pei Cheng, Mingyu Zhang, Tsz-Ki Lau, Yao Wu, Boyu Jia, Jiayu Wang, Cenqi Yan, Meng Qin, **Xinhui Lu** & Xiaowei Zhan*	Realizing small energy loss of 0.55 eV, high open-circuit voltage > 1 V and high efficiency > 10% in fullerene-free polymer solar cells via energy driver. *Adv. Mat, 29*(11): 1605216. DOI: 10.1002/adma.201605216	2017	Yes	Yes	Yes
	1.3-3#	2016				Ye Feng, Tszki Lau, Guanming Cheng, Ling Yin, Zhaohui Li, Hailin Luo, Zhuang Liu, **Xinhui Lu***, Chunlei Yang* & **Xudong Xiao***	A low-temperature formation path toward highly efficient Se-free Cu_2ZnSnS_4 solar cells fabricated through sputtering and sulfurization. *CrystEngComm, 18*: 1070-7. DOI: 10.1039/C5CE02279G	2016	Yes	Yes	Yes
	1.4-2#	2015				Qiang Huang, Zi Ye & **Xudong Xiao***	Recent progress in photocathodes for hydrogen evolution. *Journal of Materials Chemistry A, 3*: 15824-37. DOI: 10.1039/c5ta03594e	2015	Yes	Yes	Yes
	1.5-4#	2017				Boyu Jia, Yao Wu, Fuwen Zhao, Cenqi	Rhodanine flanked indacenodithiophene as non-fullerene acceptor for efficient polymer	2017	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Yan, Siya Zhu, Pei Cheng, Jiangquan Mai, Tsz-Ki Lau, **Xinhui Lu**, Chun-Jen Su, Chunru Wang & Xiaowei Zhan*	solar cells. *Science China-Chemistry, 60*(2): 257 - 263. DOI: 10.1007/s11426-016-0336-6				
	1.6-4#	2016				Shuixing Li, Wenqing Liu, Chang-Zhi Li, Tsz-Ki Lau, **Xinhui Lu**, Minmin Shi* & Hongzheng Chen*	A non-fullerene acceptor with a fully fused backbone for efficient polymer solar cells with a high open-circuit voltage. *J. of Mat Chem A, 4*(39): 14983 - 7. DOI: 10.1039/c6ta07368a	2017	Yes	Yes	Yes
	1.7-3#	2016				Shuixing Li, Wenqing Liu, Minmin Shi*, Jiangquan Mai, Tsz-Ki Lau, Junhua Wan, **Xinhui Lu**, Chang-Zhi Li* & Hongzheng Chen*	A spirobifluorene and diketopyrrolopyrrole moieties based non-fullerene acceptor for efficient and thermally stable polymer solar cells with high open-circuit voltage. *Energy & Environmental Science, 9*: 604-10. DOI: 10.1039/c5ee03481g	2016	Yes	Yes	Yes
	1.8-4#	2017				Wenjie Li, Yaping Ma*, Shihang Yang, Junbo Gong, Shengbai Zhang & **Xudong Xiao***	Nanoscopic study of the compositions, structures, and electronic properties of grain boundaries in Cu(InGa)Se_2 photovoltaic thin films. *Nano Energy, 33*: 157 - 67. DOI: 10.1016/j.nanoen.2017.01.041	2017	Yes	Yes	Yes
	1.9-2#	2015				**Xinhui Lu***, Htay Hlaing, Chang-Yong Nam, Kevin G Yager, Charles T Black & Benjamin M Ocko*	Molecular orientation and performance of nanoimprinted polymer-based blend thin film solar cells. *Chemistry of Materials, 27*(1): 60-66. DOI: 10.1021/cm502950j	2015	Yes	Yes	Yes
	1.10-5#	2018				Yaping Ma, Wenjie Li,	Band bending near grain boundaries of	2018	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Ye Feng, Zhaohui Li, Xuhang Ma, Xiaoru Liu, Xuefeng Wu, Yi Zhang, Chunlei Yang, **Xinhui Lu**, Kedong Wang* & **Xudong Xiao***	$Cu_2ZnSn(S,Se)_4$ thin films and its effect on photovoltaic performance. *Nano Energy, 51*: 37-44. DOI: 10.1016/j.nanoen.2018.06.032				
	1.11-4#	2016				Jiangquan Mai, Tsz-Ki Lau, Jun Li, Shih-Hao Peng, Chain-Shu Hsu, U-Ser Jeng, Jianrong Zeng, **Ni Zhao**, **Xudong Xiao** & **Xinhui Lu***	Understanding morphology compatibility for high-performance ternary organic solar cells. *Chem of Mat, 28*(17): 6186 - 95. DOI: 10.1021/acs.chemmater.6b02264	2017	Yes	Yes	Yes
	1.12-4#	2017				Jiangquan Mai, Haipeng Lu, Tsz-Ki Lau, Shih-Hao Peng, Chain-Shu Hsu, Wenqiang Hua, **Ni Zhao**, **Xudong Xiao** & **Xinhui Lu***	High efficiency ternary organic solar cell with morphology-compatible polymers. *J of Mat Chem A, 5*(23): 11739 - 45. DOI: 10.1039/c7ta00292k	2017	Yes	Yes	Yes
	1.13-3#	2015				Jiangquan Mai, Tsz-Ki Lau, Ting Xiao, Chun-Jen Su, U-Ser Jeng, **Ni Zhao**, **Xudong Xiao** & **Xinhui Lu***	A ternary morphology facilitated thick-film organic solar cell. *RSC Adv.*, 5(107): 88500-7. DOI: 10.1039/c5ra17268c	2016	Yes	Yes	Yes
	1.14-5#	2017				Meng Qin, Pei Cheng, Jiangquan Mai, Tsz-Ki Lau, Qianqian Zhang,	Enhancing efficiency and stability of organic solar cells by UV absorbent. *Solar RRL, 1*(12). DOI: 10.1002/solr.201700148	2018	Yes	Yes	No

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Jiayu Wang, Cenqi Yan, Kuan Liu, Chun-Jen Su, Wei You, **Xinhui Lu*** & Xiaowei Zhan*					
	1.15-1#	2015				Shihang Yang, Jiakuan Zhu, Xieqiu Zhang, Xuhang Ma, Hailin Luo, Ling Yin & **Xudong Xiao***	Bandgap optimization of submicron-thick Cu(In,Ga)Se_2 solar cells. *Progress in Photovoltaics, 23*(9): 1157-63, DOI: 10.1002/pip.2543	2016	Yes	Yes	Yes
	1.16-2#	2014				Ling Yin, Chunlei Yang, Kang Zhang, Hailin Luo, **Xieqiu Zhang**, Zhuang Liu, Guangming Cheng, Zhiyu Xiong & **Xudong Xiao***	Application of CVD graphene as transparent front electrode in Cu(In,Ga)Se_2 solar cell. *Photovoltaic Specialist Conference (PVSC)*, 2014 IEEE 40th, Issue date: 8-13 June 2014.	2015	Yes	Yes	No
	1.17-1#	2014				Ling Yin, Kang Zhang, Hailin Luo, Guanming Cheng, Xuhang Ma, Zhiyu Xiong & **Xudong Xiao***	Highly efficient graphene-based Cu(In, Ga)Se_2 solar cells with large active area. *Nanoscale, 6*(18): 10879-10886. DOI: 10.1039/c4nr02988g	2014	Yes	Yes	Yes
	1.18-3#	2016				Shuhua Zhang, Lijian Zuo*, Jiehuan Chen, Zhongqiang Zhang, Jiangquan Mai, Tsz-Ki Lau, **Xinhui Lu**, Minmin Shi &	Improved photon-to-electron response of ternary blend organic solar cells with a low band gap polymer sensitizer and interfacial modification. *J of Materials Chemistry A, 4*(5): 1702-7. DOI: 10.1039/c5ta09727d	2016	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Hongzheng Chen*					
	1.19-3#	2016				Guohua Zhong, Kinfai Tse, Yiou Zhang, Xiaoguang Li, Li Huang, Chunlei Yang*, Junyi Zhu*, Zhi Zeng, Zhenyu Zhang & **Xudong Xiao**	Induced effects by the substitution of Zn in Cu_2ZnSnX_4 (X=S and Se). *Thin Solid Films, 603*: 224-9. DOI: 10.1016/j.tsf.2016.02.005	2016	Yes	Yes	Yes
	1.20-4#	2017				Jiakuan Zhu, Tsz-Ki Lau, Shihang Yang, Jiangquan Mai, Yu-Ling Lai, Yao-Jane Hsu, Hailin Luo*, **Xinhui Lu*** & **Xudong Xiao***	New route for fabrication of high-quality Zn(S,O) buffer layer at high deposition temperature on $Cu(In,Ga)Se_2$ solar cells. *IEEE J of Photovoltaics, 7*(2): 651 - 655. DOI: 10.1109/JPHOTOV.2016.2636024	2017	Yes	Yes	Yes
	1.21-6#	2019				Junbo Gong, Yifan Kong, Jianmin Li, Kefan Wang, Xiaodong Fan, Xiangqi Wang, Zengming Zhang, Zejun Ding and **Xudong Xiao***	Enhancing photocurrent of $Cu(In,Ga)Se_2$ solar cells with actively controlled Ga grading in the absorber layer. *Nano Energy, 58*, 427-436, DOI: 10.1016/j.nanoen.2019.05.052.	2018	Yes	Yes	Yes
	1.22-6#	2018				Xuhang Ma, Yaping Ma, Shihang Yang, Chunlei Yang, Tao Lin, Kedong Wang*, **Xudong Xiao***	Pre-incorporation of Na into flexible $Cu(In,Ga)Se_2$ thin film solar cells. *Solar Energy*, *173*: 1080-1086. DOI: 10.1016/j.solener.2018.08.048	2018	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	1.23-6#	2018				Lishu Liu, Tsz-Ki Lau, Zong Zhi, Lan Huang, Shijin Wang, and **Xudong Xiao***	Modification of Mo Back Contact with MoO_{3-x} Layer and its Effect to Enhance the Performance of Cu_2ZnSnS_4 Solar Cells. *Solar RRL, 2*(12), 1800243. DOI: 10.1002/solr.201800243.	2018	Yes	Yes	Yes
	1.24-6#	2019				Junbo Gong, Yifan Kong, Jianmin Li, Xiangqi Wang, Yande Que, Zengming Zhang, Zejun Ding, **Xudong Xiao***	Role of surface microstructure of Mo back contact on alkali atom diffusion and Ga grading in Cu(In,Ga)Se_2 thin film solar cells. *Energy Science & Engineering*, DOI: 10.1002/ese3.304.	2018	Yes	Yes	Yes
	1.25-6#	2018				Jianmin Li, Yaping Ma, Guilin Chen, Junbo Gong, Xiaomin Wang, Yifan Kong, Xuhang Ma, Kedong Wang, Weimin Li, Chunlei Yang*, and **Xudong Xiao***	Effects of Ammonia-Induced Surface Modification of Cu(In,Ga)Se_2 on High-Efficiency Zn(O,S)-Based Cu(In,Ga)Se_2 Solar Cells. *Solar RRL, 3*(2), 1800254, DOI: 10.1002/solr.201800254.	2018	Yes	Yes	Yes
	1.26-6#	2019				Jianmin Li*, Lan Huang, Jie Hou, Xiao Wu, Jiabin Niu, Guilin Chen, Junbo Gong, Yifan Kong, **Xudong Xiao***	Effects of substrate orientation and solution movement in chemical bath deposition on Zn(O,S) buffer layer and Cu(In,Ga)Se_2 thin film solar cells. *Nano Energy, 58*, 427-436, DOI: 10.1016/j.nanoen.2019.01.054.	2018	Yes	Yes	Yes
	1.27-5#	2018				Heping Shen* The Duong, Jun Peng, Daniel Jacobs, Nandi Wu, Junbo Gong,	Mechanically-stacked perovskite/CIGS tandem solar cells with efficiency of 23.9% and reduced oxygen sensitivity. Energy Environ. Sci., 11: 394 - 406. DOI:	2018	Yes	No	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Yiliang Wu, Siva Krishna Karuturi, Xiao Fu, Klaus Weber, **Xudong Xiao**, Thomas P. White & Kylie Catchpole*	10.1039/c7ee02627g				
	1.28-5	2017				Yiou Zhang, Kinfai Tse, **Xudong Xiao**, and Junyi Zhu*	Controlling defects and secondary phases of CZTS by surfactant potassium. *Phys. Rev. Materials, 1*: 045403. DOI: 10.1103/PhysRevMaterials.1.045403	2018	Yes	No	No
ST2	2.1-2	2015	Book Chapter			Jian He, Baohua Wang, Shuai Chang & **Tao Chen**.	Chapter 4: Ruthenium-Based Photosensitizers for Dye-Sensitized Solar Cells. Organometallics and Related Molecules for Energy Conversion, Green Chemistry and Sustainable Technology, pp 91-114. DOI: 10.1007/978-3-662-46054-2_4	2015	Yes	Yes	Yes
	2.2-5#	2014				Sai Bai, Zhongwei Wu, Xiaojing Wu, Yizheng Jin*, **Ni Zhao**, Zhihui Chen, Qingqing Mei, Xin Wang, Zhizhen Ye, Tao Song, Ruiyuan Liu, Shuit-tong Lee & Baoquan Sun*	High-performance planar heterojunction perovskite solar cells: Preserving long charge carrier diffusion lengths and interfacial engineering. Nano Research, 7(12): 1749-58. DOI: 10.1007/s12274-014-0534-8	2018	Yes	Yes	Yes
	2.3-2#	2015				Yang Bai, Hui Yu, Zonglong Zhu, Kui Jiang, Teng Zhang, **Ni**	High performance inverted structure perovskite solar cells based on a PCBM:polystyrene blend electron transport	2016	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Zhao*, Shihe Yang* & **He Yan***	layer. *J of Materials Chemistry A*, 3(17): 9098-102. DOI: 10.1039/c4ta05309e				
	2.4-5#	2018				Jie Cao, Shu Xia Tao, Peter A. Bobbert, **Ching-Ping Wong**,* & **Ni Zhao***	Interstitial occupancy by extrinsic alkali cations in perovskites and its impact on ion migration. *Adv. Mater. 30*: 1707350. DOI: 10.1002/adma.201707350	2018	Yes	Yes	No
	2.5-4	2016				Jie Cao, Feng Wang, Hui Yu, Yang Zhou, Haipeng Lu, **Ni Zhao*** & **Ching-Ping Wong***	Porous PbI2 films for the fabrication of efficient, stable perovskite solar cells via sequential deposition. *Journal of Materials Chemistry A, 4*(26): 10223 - 30. DOI: 10.1039/c6ta03121h	2017	Yes	Yes	Yes
	2.6-4	2017				Jie Cao, Hui Yu, Shuang Zhou, Minchao Qin, Tsz-Ki Lau, **Xinhui Lu**, **Ni Zhao*** & **Ching-Ping Wong***	Low-temperature solution-processed NiO_x films for air-stable perovskite solar cells. *Journal of Materials Chemistry A, 5*(22): 11071 - 7. DOI: 10.1039/c7ta02228j	2017	Yes	Yes	Yes
	2.7-3	2015				Shuai Chang **& Tao Chen***	Mesoscopic solar cell sensitization: From dye to organometal perovskite. *Current Nanoscience, 11*(6): 685-701, DOI: 10.2174/15734137116661504162251 21	2016	Yes	Yes	Yes
	2.8-1	2014				Shuai Chang, King Young Wong, **Xudong Xiao** & **Tao Chen***	Effective improvement of the photovoltaic performance of black dye sensitized quasi-solid-state solar cells. *RSC Advances, 4*(60): 31759-31763. DOI: 10.1039/C4RA04017A	2014	Yes	Yes	Yes
	2.9-4	2017				Shangshang Chen, Guangye Zhang, Jing Liu, Huatong Yao,	An all-solution processed recombination layer with mild post-treatment enabling efficient homo-tandem non-fullerene	2017	Yes	Yes	No

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Jianquan Zhang, Tingxuan Ma, Zhengke Li & **He Yan***	organic solar cells. *Advanced Materials, 29*(6): 1604231. DOI: 10.1002/adma.201604231				
	2.10-5	2018				Shangshang Chen, Lin Zhang, Chao Ma, Dong Meng, Jianquan Zhang, Guangye Zhang, Zhengke Li, Philip C. Y. Chow, Wei Ma,* Zhaohui Wang, Kam Sing Wong, Harald Ade & **He Yan***	Alkyl chain regiochemistry of benzotriazole-based donor polymers influencing morphology and performances of non-fullerene organic solar cells. *Adv. Energy Mater.*, 8: 1702427. DOI: 10.1002/aenm.201702427	2018	Yes	Yes	No
	2.12-5	2017				Li Deng, Jiale Xie, Baohua Wang, **Tao Chen** & Chang Ming Li*	Chlorinated fluorine doped tin oxide electrodes with high work function for highly efficient planar perovskite solar cells. *Applied Physics Letters, 110*(26): 263901. DOI: 10.1063/1.4989560	2018	Yes	Yes	No
	2.13-4#	2016				Hong-Hua Fang, Feng Wang, Sampson Adjokatse, **Ni Zhao*** & Maria Antonietta Loi*	Photoluminescence Enhancement in Formamidinium lead iodide thin films. *Advanced Functional Materials, 26*(26): 4653 - 9. DOI: 10.1002/adfm.201600715	2017	Yes	Yes	Yes
	2.14-4#	2017				Yikun Guo, Yunke Li, Omar Awartani, Han Han, Jingbo Zhao, Harald Ade,* **He Yan*** & Dahui Zhao*	Improved performance of all-polymer solar cells enabled by naphthodiperylenetetraimide-based polymer acceptor. *Advanced Materials, 29*: 1700309. DOI: 10.1002/adma.201700309	2017	Yes	Yes	No

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	2.15-4#	2016				Yikun Guo, Yunke Li, Omar Awartani, Jingbo Zhao, Han Han, Harald Ade*, Dahui Zhao* & **He Yan***	A vinylene-bridged perylenediimide-based polymeric acceptor enabling efficient all-polymer solar cells processed under ambient conditions. *Advanced Materials, 28*(38): 8483 - 9. DOI: 10.1002/adma.201602387	2017	Yes	Yes	No
	2.16-3	2015				Jian He & **Tao Chen***	Additive regulated crystallization and film formation of $CH_3NH_3PbI_{3-x}Br_x$ for highly efficient planar-heterojunction solar cells. *J of Mat Chem A, 3*: 18514-20. DOI: 10.1039/c5ta05373k	2016	Yes	Yes	Yes
	2.17-4#	2016				Jian He, Chun-Fai Ng, King Young Wong, Weifeng Liu & **Tao Chen***	Photostability and moisture stability of $CH_3NH_3PbI_3$-based solar cells by ethyl cellulose. *Chempluschem, 81*(12): 1292 - 8. DOI: 10.1002/cplu.201600415	2017	Yes	Yes	Yes
	2.18-3#	2016				Po-Yu Ho, Chi-Ho Siu, Wai-Hong Yu, Panwang Zhou, **Tao Chen***, Cheuk-Lam Ho*, Lawrence Tien Lin Lee, Ying-Hsuan Feng, Jianyong Liu, Keli Han*, Yih Hsing Lo* & Wai-Yeung Wong*	Molecular engineering of starburst triarylamine donor with selenophene containing p-linker for dye-sensitized solar cells, *J of Mat Chem C, 4*(4):713-26. DOI: 10.1039/c5tc03308j	2016	Yes	Yes	Yes
	2.19-5#	2018				Huawei Hu, Kui Jiang, Philip C. Y. Chow, Long Ye, Guangye Zhang, Zhengke Li,	Influence of donor polymer on the molecular ordering of small molecular acceptors in nonfullerene polymer solar cells. *Adv. Energy Mater., 8*: 1701674. DOI:	2018	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
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						Joshua H. Carpenter, Harald Ade* & **He Yan***	10.1002/aenm.201701674				
	2.20-3#	2016				Huawei Hu, Kui Jiang, Joo-Hyun Kim, Guofang Yang, Zhengke Li, Tingxuan Ma, Guanghao Lu, Yongquan Qu*, Harald Ade* & **He Yan***	Influence of fluorination on the properties and performance of isoindigo-quaterthiophene-based polymers. J of *Materials Chemistry A*, 4(14): 5039-43. DOI: 10.1039/c6ta00006a	2016	Yes	Yes	No
	2.21-3#	2015				Huawei Hu, Kui Jiang, Guofang Yang; Jing Liu, Zhengke Li, Haoran Lin, Yuhang Liu, Jingbo Zhao, Jie Zhang, Fei Huang, Yongquan Qu, Wei Ma* & **He Yan***	Terthiophene-based D-A polymer with an asymmetric arrangement of alkyl chains that enables efficient polymer solar cells. *J of The American Chemical Society, 137*(44): 14149-57. DOI: 10.1021/jacs.5b08556	2016	Yes	Yes	No
	2.22-5#	2018				Kui Jiang, Guangye Zhang*, Guofang Yang, Jianquan Zhang, Zhengke Li, Tingxuan Ma, Huawei Hu, Wei Ma, Harald Ade & **He Yan***	Multiple cases of efficient nonfullerene ternary organic solar cells enabled by an effective morphology control method. *Advanced Energy Materials, 8*(9): 1701307. DOI: 10.1002/aenm.201701370	2018	Yes	Yes	No
	2.23-3#	2016				Linkai Li, Feng Wang, Xiaojing Wu, Hui Yu, Shuang Zhou & **Ni**	Carrier-activated polarization in organometal halide perovskites. *J of Physical Chemistry C*, 120(5): 2536-41.	2016	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Zhao*	DOI: 10.1021/acs.jpcc.5b11627				
	2.24-4#	2016				Zhengke Li*, Kui Jiang*, Guofang Yang*, Joshua Yuk Lin Lai, Tingxuan Ma, Jingbo Zhao, Wei Ma & **He Yan**	Donor polymer design enables efficient non-fullerene organic solar cells. *Nature Communications, 7*: 13094. DOI: 10.1038/ncomms13094	2017	Yes	Yes	No
	2.25-2#	2015				Zhengke Li, Haoran Lin, Kui Jiang, Joshua Carpenter, Yunke Li, Yuhang Liu, Huawei Hu, Jingbo Zhao, Wei Ma, Harald Ade* & **He Yan***	Dramatic performance enhancement for large bandgap thick-film polymer solar cells introduced by a difluorinated donor unit. *Nano Energy, 15*: 607-15. DOI: 10.1016/j.nanoen.2015.05.016	2016	Yes	Yes	No
	2.26-4#	2016				Haoran Lin, Shangshang Chen, Huawei Hu, Lu Zhang, Tingxuan Ma, Joshua Yuk Lin Lai, Zhengke Li, Anjun Qin, Xuhui Huang, Benzhong Tang & **He Yan***	Reduced intramolecular twisting improves the performance of 3D molecular acceptors in non-fullerene organic solar cells. *Advanced Materials, 28*(38): 8546 - 51. DOI: 10.1002/adma.201600997	2017	Yes	Yes	No
	2.27-3#	2015				Haoran Lin, Shangshang Chen, Zhengke Li, Joshua Yuk Lin Lai, Guofang Yang, Terry McAfee, Kui Jiang, Yunke Li,	High-performance non-fullerene polymer solar cells based on a pair of donor-acceptor materials with complementary absorption properties. *Advanced Materials, 27*(45): 7299-304. DOI: 10.1002/adma.201502775.	2016	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
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						Yuhang Liu, Huawei Hu, Jingbo Zhao, Wei Ma, Harald Ade & **He Yan***					
	2.28-3#	2016				Jing Liu, Shangshang Chen, Deping Qian, Bhoj Gautam, Guofang Yang, Jingbo Zhao, Jonas Bergqvist, Fengling Zhang,Wei Ma, Harald Ade, Olle Inganäs, Kenan Gundogdu*, Feng Gao* & **He Yan***	Fast charge separation in a non-fullerene organic solar cell with a small driving force. *Nature Energy, 1*, Article number: 16089. DOI: 10.1038/NENERGY.2016.89	2016	Yes	Yes	No
	2.29-5#	2017				Jing Liu, Lik-Kuen Ma, Zhengke Li, Huawei Hu, Tingxuan Ma, Chenhui Zhu, Harald Adec & **He Yan ***	A random donor polymer based on an asymmetric building block to tune the morphology of nonfullerene organic solar cells. *J. Mater. Chem. A, 5*: 22480 – 22488. DOI: 10.1039/c7ta07830g	2018	Yes	Yes	No
	2.30-5#	2018				Jing Liu, Lik-Kuen Ma, Haoran Lin, Lin Zhang, Zhengke Li, Wai Kit Law, Ao Shang, Huawei Hu, Wei Ma & **He Yan***	A donor polymer based on a difluorinated pentathiophene unit enabling enhanced performance for nonfullerene organic solar cells. *Small Methods, 2*(5). DOI: 10.1002/smtd.201700415	2018	Yes	Yes	No
	2.31-4	2017				Yuhang Liu, Shangshang Chen, Guangye Zhang,	A wide bandgap conjugated polymer based on a vertically connected benzodithiophene unit enabling efficient non-fullerene	2017	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Philip C. Y. Chow & **He Yan***	polymer solar cells. *J of Materials Chemistry A, 5* (29):15017 – 20. DOI: 10.1039/c7ta03600k AUG 7 2017				
	2.32 -2#	2015				Yuhang Liu, Joshua Yuk Lin Lai, Shangshang Chen, Yunke Li, Kui Jiang, Jingbo Zhao, Zhengke Li, Huawei Hu, Tingxuan Ma, Haoran Lin, Jing Liu, Jie Zhang, Fei Huang, Demei Yu & **He Yan***	Efficient non-fullerene polymer solar cells enabled by tetrahedron-shaped core based 3D-structure small-molecular electron acceptors. *J of Materials Chemistry A, 3*(26): 13632-6. DOI: 10.1039/c5ta03093e	2016	Yes	Yes	No
	2.33 -2#	2015				Yuhang Liu, Cheng Mu, Kui Jiang, Jingbo Zhao, Yunke Li, Lu Zhang, Zhengke Li, Joshua Yuk Lin Lai, Huawei Hu, Tingxuan Ma; Rongrong Hu, Demei Yu, Xuhui Huang, Ben Zhong Tang & **He Yan***	A tetraphenylethylene core-based 3D structure small molecular acceptor enabling efficient non-fullerene organic solar cells. *Advanced Materials, 27*(6): 1015-20. DOI: 10.1002/adma.201404152	2016	Yes	Yes	No
	2.34 -3#	2016				Mingzhu Long, Zefeng Chen, Tiankai Zhang, Yubin Xiao, Xiaoliang Zeng, Jian Chan, **Keyou Yan*** & **Jianbin Xu***	Ultrathin efficient perovskite solar cells employing a periodic structure of a composite hole conductor for elevated plasmonic light harvesting and hole collection. *Nanoscale, 8*(12): 6290-9. DOI: 10.1039/c5nr05042a	2016	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	2.35 -4#	2016				Mingzhu Long, Tiankai Zhang, Yang Chai, Chun-Fai Ng, Thomas C. W. Mak, **Jianbin Xu** & **Keyou Yan**	Nonstoichiometric acid-base reaction as reliable synthetic route to highly stable $CH_3NH_3PbI_3$ perovskite film. *Nature Communications, 7*: 13503. DOI: 10.1038/ncomms13503	2017	Yes	Yes	Yes
	2.36 -4#	2017				Mingzhu Long*, Tiankai Zhang*, Wangying Xu, Xiaoliang Zeng, Fangyan Xie, Qiang Li, Zefeng Chen, Fengrui Zhou, Kam Sing Wong, **Keyou* Yan** & **Jianbin Xu***	Large-grain formamidinium $PbI_{3-x}Br_x$ for high-performance perovskite solar cells via intermediate halide exchange. *Advanced Energy Materials, 7*(12): 1601882. DOI: 10.1002/aenm.201601882	2017	Yes	Yes	Yes
	2.37 -4#	2017				Mingzhu Long, Tiankai Zhang, Houyu Zhu, Guixia Li, Feng Wang, Wenyue Guo, Yang Chai, Wei Chen, Qiang Li, Kam Sing Wong, **Jianbin Xu*** & **Keyou Yan***	Textured $CH_3NH_3PbI_3$ thin film with enhanced stability for high performance perovskite solar cells. *Nano Energy, 33*: 485 - 96. DOI: 10.1016/j.nanoen.2017.02.002	2017	Yes	Yes	Yes
	2.38 -3#	2015				Tingxuan Ma, Kui Jiang, Shangshang Chen, Huawei Hu, Haoran Lin, Zhengke Li, Jingbo Zhao, Yuhang Liu, Yi-Ming	Efficient low-bandgap polymer solar cells with high open-circuit voltage and good stability. *Advanced Energy Materials, 5*(20): 1501282. DOI: 10.1002/aenm.201501282	2016	Yes	Yes	No

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Chang, Chung-Chin Hsiao & **He Yan***					
	2.39-5#	2018				Minchao Qin, Jie Cao, Tiankai Zhang, Jiangquan Mai, Tsz-Ki Lau, Shu Zhou, Yang Zhou, Jiayu Wang, Yao-Jane Hsu, **Ni Zhao**, **Jianbin Xu**, Xiaowei Zhan, and **Xinhui Lu***	Fused-ring electron acceptor ITIC-Th: A novel stabilizer for halide perovskite precursor solution. *Advanced Energy Materials, 8*(18): 1703399. DOI: 10.1002/aenm.201703399	2018	Yes	Yes	No
	2.44-3	2015				Baohua Wang & **Tao Chen***	Exceptionally stable $CH_3NH_3PbI_3$ Films in moderate humid environmental condition, *Adv Sci, 3*(2): 1500262. DOI: 10.1002/advs.201500262	2016	Yes	Yes	Yes
	2.45-3#	2016				Baohua Wang, King Young Wong, Shangfeng Yang and **Tao Chen***	Crystallinity and defect state engineering in organo-lead halide perovskite for high-efficiency solar cells, *J of Mat Chem A, 4*: 3806-12. DOI: 10.1039/c5ta09249c	2016	Yes	Yes	Yes
	2.46-2	2015				Baohua Wang, King Young Wong, **Xudong Xiao** & **Tao Chen***	Elucidating the reaction pathways in the synthesis of organolead trihalide perovskite for high-performance solar cells. *Scientific Reports, 5*: 10557. DOI: 10.1038/srep10557	2015	Yes	Yes	Yes
	2.47-1	2014				Baohua Wang, **Xudong Xiao&** & **Tao Chen***	Perovskite photovoltaics: A high-efficiency newcomer to solar cell family. *Nanoscale, 6*: 12287-12297. (Invited Minireview) DOI: 10.1039/c4nr04144e	2014	Yes	Yes	Yes
	2.48-4#	2016				Feng Wang, Wei Geng, Yang Zhou,	Phenylalkylamine passivation of organolead halide perovskites enabling	2017	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Hong-Hua Fang, Chuan-Jia Tong, Maria Antonietta Loi, Li-Min Liu & **Ni Zhao***	high-efficiency and air-stable photovoltaic cells. *Advanced Materials, 28*(45): 9986 - 92. DOI: 10.1002/adma.201603062				
	2.49 -3#	2016				Feng Wang, Jiale Ma, Fangyan Xie, Linkai Li, Jian Chen, Jun Fan & **Ni Zhao***	Organic cation-dependent degradation mechanism of organotin halide perovskites. *Advanced Functional Materials, 26*(20): 3417-23. DOI: 10.1002/adfm.201505127	2016	Yes	Yes	Yes
	2.50 -2	2015				Feng Wang, Hui Yu, Haihua Xu & **Ni Zhao***	$HPbI_3$: A new precursor compound for highly efficient solution-processed perovskite solar cells. *Advanced Functional Materials, 25*(7): 1120-6. DOI: 10.1002/adfm.201404007	2015	Yes	Yes	Yes
	2.52 -4#	2016				Fei Wu, Baohua Wang, Rui Wang, Yahan Shan, Dingyu Liu, King Young Wong, **Tao Chen*** & Linna Zhu*	Investigation on a dopant-free hole transport material for perovskite solar cells. *RSC Advances, 6*(73): 69365 - 9. DOI: 10.1039/c6ra07603c	2017	Yes	Yes	Yes
	2.53 -2#	2015				Xiaojing Wu, Hui Yu, Linkai Li, Feng Wang, Haihua Xu & **Ni Zhao***	Composition-dependent light-induced dipole moment change in organometal halide perovskites. *Journal of Physical Chemistry C, 119*(2): 1253-9. DOI: 10.1021/jp511314a	2015	Yes	Yes	Yes
	2.54 -3#	2015				Zhengcui Wu, Baohua Wang, Jian He & **Tao Chen***	Synthesis of tunable-band-gap "Open-Box" halide perovskites by use of anion exchange and internal dissolution procedures, *J of Colloid & Interface Sci, 461*: 162-7. DOI: 10.1016/j.jcis.2015.09.005	2016	Yes	Yes	Yes

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	2.55 -3#	2016				Yubin Xiao, Han Wang, Shuang Zhou, Keyou Yan, Weiguang Xie, Zhiqiang Guan, Sai-Wing Tsang* & **Jian-Bin Xu***	Efficient ternary bulk heterojunction solar cells with PCDTBT as hole-cascade material. *Nano Energy, 19*: 476 - 85. DOI: 10.1016/j.nanoen.2015.11.016	2017	Yes	Yes	Yes
	2.56 -1#	2014				Yubin Xiao, Shuang Zhou, Yaorong Su, Han Wang, Lei Ye, Sai-Wing Tsang, Fangyan Xie & **Jianbin Xu**	Enhanced efficiency of organic solar cells by mixed orthogonal solvents. *Organic Electronics, 15*(9): 2007-2013. DOI: 10.1016/ j.orgel.2014.05.011	2014	Yes	Yes	Yes
	2.57 -5#	2018				Jiangsheng Xie, V. Arivazhagan, Ke Xiao, **Keyou Yan**, Zhengrui Yang, Yaping Qiang, Pengjie Hang, Ge Li, Can Cui, Xuegong Yu* & Deren Yang*	A ternary organic electron transport layer for efficient and photostable perovskite solar cells under full spectrum illumination. *J. Mater. Chem. A, 6*: 5566. DOI: 10.1039/c8ta00816g	2018	Yes	Yes	No
	2.59 -4#	2016				Keyou Yan*, Zhanhua Wei, Tiankai Zhang, Xiaoli Zheng, Mingzhu Long, Zefeng Chen, Weiguang Xie, Teng Zhang, Yuda Zhao, **Jianbin Xu**, Yang Chai* & Shihe Yang*	Near-infrared photoresponse of one-sided abrupt $MAPbI_3/TiO_2$ heterojunction through a tunneling process. *Advanced Functional Materials, 26*(46): 8545 - 54. DOI: 10.1002/adfm.201602736	2017	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	2.60-2#	2015				**Keyou Yan***, Mingzhu Long, Tiankai Zhang, Zhanhua Wei, Haining Chen, Shihe Yang* & **Jianbin Xu***	Hybrid halide perovskite solar cell precursors: Colloidal chemistry and coordination engineering behind device processing for high efficiency. *Journal of the American Chemical Society, 137*(13): 4460-8. DOI: 10.1021/jacs.5b00321	2015	Yes	Yes	Yes
	2.61-2#	2015				Keyou Yan, Zhanhua Wei, Jinkai Li, Haining Chen, Ya Yi, Xiaoli Zheng, Xia Long, Zilong Wang, **Jiannong Wang**, **Jianbin Xu** & Shihe Yang*	High-performance graphene-based hole conductor-free perovskite solar cells: Schottky junction enhanced hole extraction and electron blocking. *Small, 11*(19): 2269-74. DOI: 10.1002/smll.201403348	2015	Yes	Yes	Yes
	2.62-4#	2017				Guofang Yang, Zhengke Li, Kui Jiang, Jie Zhang, Jianya Chen, Guangye Zhang, Fei Huang, Wei Ma* & **He Yan***	Optimal extent of fluorination enabling strong temperature-dependent aggregation, favorable blend morphology and high-efficiency polymer solar cells. *Science China-Chemistry, 60*(4): 545 - 51. DOI: 10.1007/s11426-016-0378-y	2017	Yes	Yes	No
	2.63-5#	2018				Guofang Yang, Jing Liu, Lik-Kuen Ma, Shangshang Chen, Joshua Yuk Lin Lai, Wei Ma & **He Yan***	Understanding the influence of carboxylate substitution on the property of high-performance donor polymers in non-fullerene organic solar cells. *Materials Chemistry Frontiers, 2* (7):1360-1365. DOI: 10.1039/c8qm00101d	2018	Yes	Yes	No
	2.64-5#	2018				Huatong Yao, Yunke Li, Huawei Hu, Philip	A Facile method to fine-tune polymer aggregation properties and blend	2018	Yes	Yes	No

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						C. Y. Chow, Shangshang Chen, Jingbo Zhao, Zhengke Li, Joshua H. Carpenter, Joshua Yuk Lin Lai, Guofang Yang, Yuhang Liu, Haoran Lin, Harald Ade* & **He Yan***	morphology of polymer solar cells using donor polymers with randomly distributed alkyl chains. *Advanced Energy Materials, 8*(6): 1701895. DOI: 10.1002/aenm.201701895				
	2.66-1	2014				Lei Ye, Hai-Hua Xu, Hui Yu, Wang-Ying Xu, Hao Li, Han Wang, **Ni Zhao*** & **Jian-Bin Xu***	Ternary bulk heterojunction photovoltaic cells composed of small molecule donor additive as cascade material. *Journal of Physical Chemistry C, 118*(35): 20094−20099. DOI: 10.1021/jp504365y	2014	Yes	Yes	No
	2.67-5#	2018				Long Ye, Huawei Hu, Masoud Ghasemi, Tonghui Wang, Brian A. Collins, Joo-Hyun Kim, Kui Jiang, Joshua H. Carpenter, Hong Li, Zhengke Li, Terry McAfee, Jingbo Zhao, Xiankai Chen, Joshua Lin Yuk Lai, Tingxuan Ma, Jean-Luc Bredas, **He Yan*** & Ade, Harald*	Quantitative relations between interaction parameter, miscibility and function in organic solar cells. *Nature Materials, 17*(3): 253-60. DOI: 10.1038/s41563-017-0005-1	2018	Yes	Yes	No
	2.68-3#	2016				Hui Yu, Haipeng Lu, Fangyan Xie, Shuang	Native defect-induced hysteresis behavior in organolead iodide perovskite solar cells.	2016	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Zhou & **Ni Zhao***	*Advanced Functional Materials, 26*(9): 1411-9. DOI: 10.1002/adfm.201504997				
	2.69-1#	2014				Hui Yu, Feng Wang, Fangyan Xie, Wenwu Li, Jian Chen & **Ni Zhao**	The role of chlorine in the formation process of "$CH_3NH_3PbI_{3-x}Cl_x$" Perovskite. *Advanced Functional Materials*, 24(45): 7102-8. DOI: 10.1002/adfm.201401872.	2014	Yes	Yes	Yes
	2.71-5#	2018				Guangye Zhang, Jingbo Zhao, Philip C. Y. Chow, Kui Jiang, Jianquan Zhang, Zonglong Zhu, Jie Zhang, Fei Huang & **He Yan***	Nonfullerene Acceptor Molecules for Bulk Heterojunction Organic Solar Cells. *Chemical Reviews, 118*(7): 3447-507. DOI: 10.1021/acs.chemrev.7b00535	2018	Yes	Yes	No
	2.72-5#	2017				Jianquan Zhang, Yunke Li, Jiachen Huang, Huawei Hu, Guangye Zhang, Tingxuan Ma, Philip C. Y. Chow, Harald Ade, Ding Pan & **He Yan***	Ring-Fusion of Perylene Diimide Acceptor Enabling Efficient Nonfullerene Organic Solar Cells with a Small Voltage Loss. *J of the American Chem Soc, 139*(45): 16092-5. DOI: 10.1021/jacs.7b09998	2018	Yes	Yes	No
	2.73-5#	2017				Jianquan Zhang, Kui Jiang, Guofang Yang, Tingxuan Ma, Jing Liu, Zhengke Li, Joshua Yuk Lin Lai, Wei Ma* & **He Yan***	Tuning Energy Levels without Negatively Affecting Morphology: A Promising Approach to Achieving Optimal Energetic Match and Efficient Nonfullerene Polymer Solar Cells. *Advanced Energy Materials, 7*(15): 1602119. DOI: 10.1002/aenm.201602119	2018	Yes	Yes	Yes
	2.74-5#	2017				Tiankai Zhang,	Crystallinity Preservation and Ion	2018	Yes	Yes	Yes

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						Mingzhu Long, Keyou Yan, Minchao Qin, **Xinhui Lu**, Xiaoliang Zeng, Chi Man Cheng, Kam Sing Wong, Pengyi Liu, Weiguang Xie* & **Jianbin Xu***	Migration Suppression through Dual Ion Exchange Strategy for Stable Mixed Perovskite Solar Cells. *Advanced Energy Materials, 7*(15). DOI: 10.1002/aenm.201700118				
	2.75-4#	2016				Tiankai Zhang, Mingzhu Long, **Keyou Yan**, Xiaoliang Zeng, Fengrui Zhou, Zefeng Chen, Xi Wan, Kun Chen, Pengyi Liu, Faming Li, Tao Yu, Weiguang Xie* & **Jianbin Xu***	Facet-dependent property of sequentially deposited perovskite thin films: Chemical origin and self-annihilation. *ACS Applied Materials & Interfaces, 8*(47): 32366 - 75. DOI: 10.1021/acsami.6b11986	2017	Yes	Yes	No
	2.76-3#	2016				Jingbo Zhao, Yunke Li, Adrian Hunt, Jianquan Zhang, Huatong Yao, Zhengke Li, Jie Zhang, Fei Huang, Harald Ade* & **He Yan***	A Difluorobenzoxadiazole building block for efficient polymer solar cells. *Advanced Materials, 28*: 1868-73. DOI: 10.1002/adma.201504611	2016	Yes	Yes	No
	2.77-3#	2016				Jingbo Zhao, Yunke Li, Guofang Yang, Kui Jiang, Haoran Lin, Harald Ade, Wei Ma*	Efficient organic solar cells processed from hydrocarbon solvents. *Nature Energy, 1*, Article number: 15027. DOI: 10.1038/NENERGY.2015.27	2016	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						& **He Yan***					
	2.78-3#	2015				Jingbo Zhao, Yunke Li, Jianquan Zhang, Lu Zhang, Joshua Yuk Lin Lai, Kui Jiang, Cheng Mu, Zhengke Li, Chun Lam Clement Chan, Adrian Hunt, Subhrangsu Mukherjee, Harald Ade, Xuhui Huang & **He Yan***	The influence of spacer units on molecular properties and solar cell performance of non-fullerene acceptors. *J of Materials Chemistry A, 3*(40): 20108-12. DOI: 10.1039/c5ta05339k.	2016	Yes	Yes	No
	2.79-2#	2015				Jingbo Zhao, Yunke Li, Haoran Lin, Yuhang Liu, Kui Jiang, Cheng Mu, Tingxuan Ma, Joshua Yuk Lin Lai, Huawei Hu, Demei Yu and **He Yan***	High-efficiency non-fullerene organic solar cells enabled by a difluorobenzothiadiazole-based donor polymer combined with a properly matched small molecule acceptor. *Energy Environ Sci*, 8: 520-525 DOI: 10.1039/C4EE02990A	2015	Yes	Yes	Yes
	2.80-6	2016				Xi Zhou, Dien Wang, Ji Wang, and **Shih-Chi Chen***	Precision design and control of a flexure-based roll-to-roll printing system. *Precision Engineering 45*: 332 – 41. DOI: 10.1016/j.precisioneng.2016.03.010	2016	Yes	Yes	Yes
	2.81-2	2015				Xi Zhou*, Huihua Xu*, Jiyi Cheng, **Ni Zhao**, & **Shih-Chi Chen**.	Flexure-based roll-to-roll platform: A practical solution for realizing large-area microcontact printing. *Scientific Reports, 5*: 10402. DOI:1040210.1038/srep10402	2015	Yes	Yes	Yes
	2.82	2016				Yang Zhou, Feng	Distribution of bromine in mixed iodide-	2017	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	-4#					Wang, Hong-Hua Fang, Maria Antonietta Loi, Fang-Yan Xie, **Ni Zhao*** & **Ching-Ping Wong***	bromide organolead perovskites and its impact on photovoltaic performance. *Journal of Materials Chemistry A, 4*(41): 16191 - 7. DOI: 10.1039/c6ta07647e				
	2.83 -5#	2017				Yang Zhou, Feng Wang, Yu Cao, Jian-Pu Wang, Hong-Hua Fang, Maria Antonietta Loi, **Ni Zhao*** & **Ching-Ping Wong***	Benzylamine-treated wide-bandgap perovskite with high thermal-photostability and photovoltaic performance. *Advanced Energy Materials, 7*(22). DOI: 10.1002/aenm.201701048	2018	Yes	Yes	Yes
	2.85 -4#	2016				Zonglong Zhu, Qifan Xue, Hexiang He, Kui Jiang, Zhicheng Hu, Yang Bai, Teng Zhang, Shuang Xiao, Kenan Gundogdu, Bhoj Raj Gautam, Harald Ade, Fei Huang, Kam Sing Wong, Hin-Lap Yip*, Shihe Yang* & **He Yan***	A PCBM electron transport layer containing small amounts of dual polymer additives that enables enhanced perovskite solar cell performance. *Advanced Science, 3*(9): 1500353. DOI: 10.1002/advs.201500353	2017	Yes	Yes	No
	2.86 -6#	2018				Long Ye, Brian A. Collins, Xuechen Jiao, Jingbo Zhao, **He Yan**, and Harald Ade*	Miscibility–Function Relations in Organic Solar Cells: Significance of Optimal Miscibility in Relation to Percolation. *Advanced Energy Materials, 8*(28), 1703058. DOI: 10.1002/aenm.201703058.	2018	Yes	Yes	Yes

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	2.87-6#	2017				Huatong Yao, Yunke Li, Huawei Hu, Philip C. Y. Chow, Shangshang Chen, Jingbo Zhao, Zhengke Li, Joshua H. Carpenter, Joshua Yuk Lin Lai, Guofang Yang, Yuhang Liu, Haoran Lin, Harald Ade,* and **He Yan***	A Facile Method to Fine-Tune Polymer Aggregation Properties and Blend Morphology of Polymer Solar Cells Using Donor Polymers with Randomly Distributed Alkyl Chains. *Advanced Energy Materials, 8*(6), 1701895. DOI: 10.1002/aenm.201701895.	2017	Yes	Yes	Yes
	2.88-6#	2018				Mingzhu Long, Tiankai Zhang, Mingzhen Liu, Zefeng Chen, Chen Wang, Weiguang Xie, Fangyan Xie, Jian Chen, Gang Li*, **Jianbin Xu***.	Abnormal synergetic effect of organic and halide ions on the stability and optoelectronic properties of mixed perovskite via in situ characterizations. *Adv. Mater.*, 2018, *30,* 1801562. DOI: 10.1002/adma.201801562	2018	Yes	Yes	Yes
	2.89-6#	2018				Lingling Zhan, Shuixing Li, Huotian Zhang, Feng Gao,* Tsz-Ki Lau, **Xinhui Lu**,* Danyang Sun, Peng Wang, Minmin Shi,* Chang-Zhi Li, and Hongzheng Chen*	A Near-Infrared Photoactive Morphology Modifier Leads to Significant Current Improvement and Energy Loss Mitigation for Ternary Organic Solar Cells. *Advanced Science, 5*(8), 1800755. DOI: 10.1002/advs.201800755.	2018	Yes	Yes	Yes
	2.90-6#	2018				Shuixing Dai, Yiqun	Effect of Core Size on Performance of	2018	Yes	Yes	Yes

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						Xiao, Peiyao Xue, Jeromy James Rech, Kuan Liu, Zeyuan Li, **Xinhui Lu**, Wei You, and Xiaowei Zhan*	Fused-Ring Electron Acceptors. *Chemistry of Materials, 30*(15), 5390-5396. DOI: 10.1021/acs.chemmater.8b02222.				
	2.91-6#	2018				Jiayu Wang, Junxiang Zhang, Yiqun Xiao, Tong Xiao, Runyu Zhu, Cenqi Yan, Youquan Fu, Guanghao Lu, **Xinhui Lu**, Seth R. Marder, and Xiaowei Zhan*	Effect of Isomerization on High-Performance Nonfullerene Electron Acceptors. *Journal of the American Chemical Society, 140*(29), 9140-9147. DOI: 10.1021/jacs.8b04027.	2018	Yes	Yes	Yes
	2.92-6#	2018				Yang Zhou, Yong-Heng Jia, Hong-Hua Fang, Maria Antonietta Loi, Fang-Yan Xie, Li Gong, Min-Chao Qin, Xin-Hui Lu, **Ching-Ping Wong**,* and **Ni Zhao***	Composition-Tuned Wide Bandgap Perovskites: From Grain Engineering to Stability and Performance Improvement. *Advanced Functional Materials, 28*(35), 1803130. DOI: 10.1002/adfm.201803130.	2018	Yes	Yes	Yes
	2.93-6#	2018				Jiangquan Mai, Yiqun Xiao, Guodong Zhou, Jiayu Wang, Jingshuai Zhu, **Ni Zhao**, Xiaowei Zhan, and **Xinhui Lu***	Hidden Structure Ordering Along Backbone of Fused-Ring Electron Acceptors Enhanced by Ternary Bulk Heterojunction. *Advanced Materials, 30*(34), 1802888. DOI: 10.1002/adma.201802888.	2018	Yes	Yes	Yes
	2.94-6#	2018				Kui Jiang,‡ Fei Wu,‡*	A perylene diimide-based electron transport	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Hui Yu, Yanqing Yao, Guangye Zhang, Linna Zhu * and **He Yan**	layer enabling efficient inverted perovskite solar cells. *Journal of Materials Chemistry A, 6*(35), 16868-16873. DOI: 10.1039/c8ta06081a.				
	2.95-6#	2018				Huawei Hu, Yunke Li, Jianquan Zhang, Zhengxing Peng, Lik-kuen Ma, Jingming Xin, Jiachen Huang, Tingxuan Ma, Kui Jiang, Guangye Zhang, Wei Ma, Harald Ade,* and **He Yan***	Effect of Ring-Fusion on Miscibility and Domain Purity: Key Factors Determining the Performance of PDI-Based Nonfullerene Organic Solar Cells. *Advanced Energy Materials, 8*(26), 1800234. DOI: 10.1002/aenm.201800234.	2018	Yes	Yes	Yes
	2.96-6#	2018				Jing Liu,‡ Lik-Kuen Ma, ‡ Fu Kit Sheong, Lin Zhang, Huawei Hu, Jing-Xuan Zhang, Jianquan Zhang, Zhengke Li, Chao Ma, Xu Han, Ding Pan, Harald Ade, Wei Ma and **He Yan ***	Carboxylate substitution position influencing polymer properties and enabling non-fullerene organic solar cells with high open circuit voltage and low voltage loss. *Journal of Materials Chemistry A, 6*(35), 16874-16881. DOI: 10.1039/c8ta04935a.	2018	Yes	Yes	Yes
	2.97-6#	2018				Yuzhong Chen, Tao Liu, Huawei Hu, Tingxuan Ma, Joshua Yuk Lin Lai, Jianquan Zhang,	Modulation of End Groups for Low-Bandgap Nonfullerene Acceptors Enabling High-Performance Organic Solar Cells. *Advanced Energy Materials, 8*(27), 1801203. DOI: 10.1002/aenm.201801203.	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Harald Ade,* and **He Yan***					
	2.98-6#	2018				Tao Liu,‡ Zhenghui Luo,‡ Qunping Fan, Guangye Zhang, Lin Zhang, Wei Gao, Xia Guo, Wei Ma, * Maojie Zhang, * Chuluo Yang, * Yongfang Li and **He Yan** *	Use of two structurally similar small molecular acceptors enabling ternary organic solar cells with high efficiencies and fill factors. *Energy & Environmental Science, 11*(11), 3275-3282. DOI: 10.1039/c8ee01700j.	2018	Yes	Yes	Yes
	2.99-6#	2018				Jianquan Zhang, Huei Shuan Tan, Xugang Guo*, Antonio Facchetti * and He Yan*	Material insights and challenges for non-fullerene organic solar cells based on small molecular acceptors. *Nature Energy, 3*(9), 720-731. DOI: 10.1038/s41560-018-0181-5.	2018	Yes	Yes	Yes
	2.100-6#	2018				Shangshang Chen, Huatong Yao, Bo Hu, Guangye Zhang, Lingeswaran Arunagiri, Lik-Kuen Ma, Jiachen Huang, Jianquan Zhang, Zonglong Zhu, Fujin Bai, Wei Ma,* and **He Yan***	A Nonfullerene Semitransparent Tandem Organic Solar Cell with 10.5% Power Conversion Efficiency. *Advanced Energy Materials, 8*(31), 1800529. DOI: 10.1002/aenm.201800529.	2018	Yes	Yes	Yes
	2.101-6#	2018				Kui Jiang,§ Fei Wu,*,§ Linna Zhu,* and **He Yan***	Naphthodiperylenetetraimide-Based Polymer as Electron-Transporting Material for Efficient Inverted Perovskite Solar	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
							Cells. *ACS applied materials & interfaces, 10*(42), 36549-36555. DOI: 10.1021/acsami.8b12675.				
	2.102-6#	2018				Shangshang Chen, Yuming Wang, Lin Zhang, Jingbo Zhao, Yuzhong Chen, Danlei Zhu, Huatong Yao, Guangye Zhang, Wei Ma, Richard H. Friend, Philip C. Y. Chow,* Feng Gao,* and **He Yan***	Efficient Nonfullerene Organic Solar Cells with Small Driving Forces for Both Hole and Electron Transfer. *Advanced Materials, 30*(45), 1804215. DOI: 10.1002/adma.201804215.	2018	Yes	Yes	Yes
	2.103-6#	2018				Jing Liu†, Lik-Kuen Ma†, Zhengke Li †, Huawei Hu, Fu Kit Sheong, Guangye Zhang, Harald Ade , and **He Yan***	Donor polymer based on alkylthiophene side chains for efficient non-fullerene organic solar cells: Insights into fluorination and side chain effects on polymer aggregation and blend morphology. *Journal of Materials Chemistry A, 6*(46), 23270-23277. DOI: 10.1039/C8TA08769E.	2018	Yes	Yes	Yes
	2.104-6#	2018				Fang-Xiao Chen, Jing-Qi Xu, Zhi-Xi Liu, Ming Chen, Ruoxi Xia, Yongchao Yang, Tsz-Ki Lau, Yingzhu Zhang, **Xinhui Lu**, Hin-Lap Yip, Alex K.-Y. Jen,	Near-Infrared Electron Acceptors with Fluorinated Regioisomeric Backbone for Highly Efficient Polymer Solar Cells. *Advanced Materials, 30*(52), 1803769. DOI: 10.1002/adma.201803769.	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Hongzheng Chen, and Chang-Zhi Li*					
	2.105-6#	2018				Jiayu Wang, Yiqun Xiao, Wei Wang, Cenqi Yan, Jeromy Rech, Mingyu Zhang, Wei You, **Xinhui Lu*** and Xiaowei Zhan*	Pairing 1D/2D-conjugation donors/acceptors towards high-performance organic solar cells. *Materials Chemistry Frontiers, 3*(2), 276-283. DOI: 10.1039/c8qm00512e.	2018	Yes	Yes	Yes
	2.106-6#	2018				Shenghe Zhao, Jiangsheng Xie, Guanghui Cheng, Yuren Xiang, Houyu Zhu, Wenyue Guo, Han Wang, Minchao Qin, Xinhui Lu, Junle Qu, Jiannong Wang, **Jianbin Xu*** & **Keyou Yan***	General Nondestructive Passivation by 4-Fluoroaniline for Perovskite Solar Cells with Improved Performance and Stability. *Small 14* (50). DOI: 10.1002/smll.201803350	2018	Yes	Yes	Yes
	2.107-6#	2018				Tiankai Zhang, Mingzhu Long, Minchao Qin, Xinhui Lu, Si Chen, Fangyan Xie, Li Gong, Jian Chen, Zefeng Chen, Wangying Xu, Pengyi Liu, Weiguang Xie*, **Jianbin Xu** *.	Stable and Efficient 3D-2D Perovskite-Perovskite Planar Heterojunction Solar Cell without Organic Hole Transport Layer. *Joule*, 2018, *2*, 2706. DOI: 10.1016/j.joule.2018.09.022	2018	Yes	Yes	Yes
	2.108-6#	2019				Han Wang, Guanghui Cheng, Jiangsheng	Bulk Heterojunction Quasi-Two-Dimensional Perovskite Solar Cell with	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Xie, Shenghe Zhao, Minchao Qin, Christopher C. S. Chan, Yongcai Qiu, Guangxu Chen, Chunhui Duan, Kam Sing Wong, Jiannong Wang, Xinhui Lu, **Jianbin Xu*** and **Keyou Yan***	1.18 V High Photovoltage. *ACS Appl. Mater. Interfaces* **2019**, 11, 2935-2943. DOI: 10.1021/acsami.8b17030				
	2.109-6#	2019				Huatong Yao,⊥ Fujin Bai,⊥ Huawei Hu, Lingeswaran Arunagiri, Jianquan Zhang, Yuzhong Chen, Han Yu, Shangshang Chen, Tao Liu, Joshua Yuk Lin Lai, Yingping Zou, Harald Ade,* and **He Yan***	Efficient All-Polymer Solar Cells based on a New Polymer Acceptor Achieving 10.3% Power Conversion Efficiency. *ACS Energy Letters, 4*(2), 417-422. DOI: 10.1021/acsenergylett.8b02114.	2018	Yes	Yes	Yes
	2.110-6#	2019				Han Han, Lik-Kuen Ma, Lin Zhang, Yikun Guo, Yunke Li, Han Yu, Wei Ma, **He Yan**,* & Dahui Zhao*	Tweaking the Molecular Geometry of a Tetraperylenediimide Acceptor. *ACS applied materials & interfaces, 11*(7), 6970-6977. DOI: 10.1021/acsami.8b19065.	2018	Yes	Yes	Yes
	2.111-6#	2019				Zhenghui Luo, Tao Liu*, Zhanxiang	Isomerization of Perylene Diimide Based Acceptors Enabling High-Performance	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Chen, Yiqun Xiao, Guangye Zhang, Lijun Huo, Cheng Zhong, Xinhui Lu*, **He Yan**, Yanming Sun*, and Chuluo Yang	Nonfullerene Organic Solar Cells with Excellent Fill Factor. *Advanced Science, 6*(6), 1802065. DOI: 10.1002/advs.201802065.				
	2.112-6#	2019				Minghui Hao, Tao Liu*, Yiqun Xiao, Lik-Kuen Ma, Guangye Zhang, Cheng Zhong, Zhanxiang Chen, Zhenghui Luo, Xinhui Lu, **He Yan***, Lei Wang*, and Chuluo Yang*	Achieving Balanced Charge Transport and Favorable Blend Morphology in Non-Fullerene Solar Cells via Acceptor End Group Modification. *Chemistry of Materials, 31*(5), 1752-1760. DOI: 10.1021/acs.chemmater.8b05327.	2018	Yes	Yes	Yes
	2.113-6#	2019				Jianquan Zhang, Fujin Bai, Yunke Li, Huawei Hu, Bin Liu, Xinhui Zou, Han Yu, Jiachen Huang, Ding Pan, Harald Ade* and **He Yan***	Intramolecular p-stacked perylene-diimide acceptors for non-fullerene organic solar cells. *Journal of Materials Chemistry A, 7*(14), 8136-8143. DOI: 10.1039/c9ta00343f.	2018	Yes	Yes	Yes
	2.115-6#	2019				Wei Gao, Tao Liu,* Jiewei Li, Yiqun Xiao, Guangye Zhang, Yuzhong Chen, Cheng Zhong, **Xinhui Lu***, **He Yan***, & Chuluo	Simultaneously increasing open-circuit voltage and short-circuit current to minimize the energy loss in organic solar cells via designing asymmetrical non-fullerene acceptor. *Journal of Materials Chemistry A, 7*(18), 11053-11061. DOI:	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Yang*	10.1039/c9ta02283j.				
	2.116-6#	2019				Mingzhu Long, Tiankai Zhang, Dongcheng Chen, Minchao Qin, Zefeng Chen, Li Gong, Xinhui Lu, Fangyan Xie, Weiguang Xie, Jian Chen, and **Jianbin Xu***	Interlayer Interaction Enhancement in Ruddlesden–Popper Perovskite Solar Cells toward High Efficiency and Phase Stability. *ACS Energy Lett.*, 2019, *4*, 1025. DOI: 10.1021/acsenergylett.9b00351	2018	Yes	Yes	Yes
	2.117-6#	2019				Zhi-Peng Yu, Zhi-Xi Liu, Fang-Xiao Chen, Ran Qin, Tsz-Ki Lau, Jing-Lin Yin, Xueqian Kong, **Xinhui Lu**, Minmin Shi, Chang-Zhi Li & Hongzheng Chen	Simple non-fused electron acceptors for efficient and stable organic solar cells. *Nature Communications, 10*(1), 2152. DOI: 10.1038/s41467-019-10098-z.	2018	Yes	Yes	Yes
	2.118-6#	2019				Qunping Fan, Tao Liu*, Wei Gao, Yiqun Xiao, Jingnan Wu, Wenyan Su, Xia Guo, **Xinhui Lu***, Chuluo Yang, **He Yan***, Maojie Zhang* & Yongfang Li	Overcoming the energy loss in asymmetrical nonfullerene acceptor-based polymer solar cells by halogenation of polymer donors. *Journal of Materials Chemistry A.* DOI: 10.1039/c9ta02243k.	2018	Yes	Yes	Yes
	2.119-6#	2019				Tao Liu*, Zhenghui Luo, Yuzhong Chen, Tao Yang, Yiqun Xiao,	A nonfullerene acceptor with a 1000 nm absorption edge enables ternary organic solar cells with improved optical and	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Guangye Zhang, Ruijie Ma, **Xinhui Lu***, Chuanlang Zhan*, Maojie Zhang, Chuluo Yang*, Yongfang Li, Jiannian Yao and **He Yan***	morphological properties and efficiencies over 15%. *Energy & Environmental Science*. DOI: 10.1039/c9ee01030k.				
	2.120-6#	2019				Lingeswaran Arunagiri, Guangye Zhang*, Huawei Hu, Huatong Yao, Kai Zhang, Yunke Li, Philip C. Y. Chow, Harald Ade, and **He Yan***	Temperature-Dependent Aggregation Donor Polymers Enable Highly Efficient Sequentially Processed Organic Photovoltaics Without the Need of Orthogonal Solvents. *Advanced Functional Materials*, 1902478. DOI: 10.1002/adfm.201902478.	2018	Yes	Yes	Yes
	2.121-6#	2019				Zhi-Xi Liua, Tsz-K Lau, Guanqing Zhou, Shuixing Li, Jie Ren, Sandeep K. Das, Ruoxi Xia, Gang Wu, Haiming Zhu, **Xinhui Lu**, Hin-Lap Yip, Hongzheng Chen, Chang-Zhi Lia*	Achieving efficient organic solar cells and broadband photodetectors via simple compositional tuning of ternary blends. *Nano Energy*. DOI: 10.1016/j.nanoen.2019.06.003.	2018	Yes	Yes	Yes
	2.122-6#	2019				Jianquan Zhang, Yunke Li, Huawei Hu, Guangye Zhang,	Chlorinated Thiophene End Groups for Highly Crystalline Alkylated Non-Fullerene Acceptors toward Efficient Organic Solar	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Harald Ade*, & **He Yan***	Cells. *Chemistry of Materials.* DOI: 10.1021/acs.chemmater.9b00980.				
	2.123-6#	2019				Jiangsheng Xie, Pengjie Hang, Han Wang, Shenghe Zhao, Ge Li, Yanjun Fang, Feng Liu, Xinlu Guo, Hepeng Zhu, Xinhui Lu, Xuegong Yu*, Christopher C. S. Chan, Kam Sing Wong, Deren Yang, **Jianbin Xu*** & **Keyou Yan***	Perovskite Bifunctional Device with Improved Electroluminescent and Photovoltaic Performance through Interfacial Energy-Band Engineering. *Advanced Materials* **2019,** *31* (33). DOI: 10.1002/adma.201902543	2018	Yes	Yes	Yes
	2.124-6#	2019				Lingling Zhan, Shuixing Li, Shuhua Zhang, Tsz-Ki Lau, Thomas Rieks Andersen, **Xinhui Lu**, Minmin Shi, Chang-Zhi Li, Gang Li*, and Hongzheng Chen*	Combining Fused-Ring and Unfused-Core Electron Acceptors Enables Efficient Ternary Organic Solar Cells with Enhanced Fill Factor and Broad Compositional Tolerance. *Solar RRL*. DOI: 10.1002/solr.201900317.	2018	Yes	Yes	Yes
	2.125-6#	2019				Yongqiang Shi, Yumin Tang, Kun Yang, Minchao Qin, Yang Wang, Huiliang Sun, Mengyao Su, **Xinhui Lu**, Ming Zhou* & Xugang Guo*	Thiazolothienyl imide-based wide bandgap copolymers for efficient polymer solar cells. *Journal of Materials Chemistry C, 7*(36), 11142-11151. DOI: 10.1039/c9tc03301g.	2018	Yes	Yes	Yes
	2.12	2019				Yang Zhou, Haibo	Enhanced Incorporation of Guanidinium in	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	6-6#					Xue, Yong-Heng Jia, Geert Brocks, Shuxia Tao*, and **Ni Zhao***	Formamidinium-Based Perovskites for Efficient and Stable Photovoltaics: The Role of Cs and Br. Advanced Functional Materials. DOI: 10.1002/adfm.201905739.				
	2.127-1#	2014				Yuhang Liu, Jingbo Zhao, Zhengke Li, Cheng Mu, Wei Ma, Huawei Hu, Kui Jiang, Haoran Lin, Harald Ade & **He Yan***	Aggregation and morphology control enables multiple cases of high-efficiency polymer solar cells. *Nature Communications, 5*: 5293. DOI: 10.1038/ncomms6293.	2014	Yes	Yes	Yes
ST3	3.1-5	2018				Donald K.L. Chan & **Jimmy C. Yu***	Facile synthesis of carbon- and oxygen-rich graphitic carbon nitride with enhanced visible-light photocatalytic activity. *Catalysis Today, 310*: 26–31. DOI: 10.1016/j.cattod.2017.05.017	2018	Yes	Yes	No
	3.2-5	2017				Donald K. L. Chan, **Jimmy C. Yu***, Yecheng Li & Zhuofeng Hu	A metal-free composite photocatalyst of graphene quantum dots deposited on red phosphorus. J of Environmental Sciences, 60: 91-7. DOI: 10.1016/j.jes.2016.11.025	2018	Yes	Yes	No
	3.3-5#	2018				Xiao-Fei Chen, Mohamed E. El-Khouly,* Kei Ohkubo, Shunichi Fukuzumi* & **Dennis K. P. Ng***	Assemblies of boron dipyrromethene/porphyrin, phthalocyanine, and C60 moieties as artificial models of photosynthesis: Synthesis, supramolecular interactions, and photophysical studies. *Chem. Eur. J. 24*: 3862-3872. DOI: 10.1002/chem.201705843	2018	Yes	Yes	No
	3.4-6#	2015				AR Damanpack*, M Bodaghi, **WH Liao**, MM Aghdam & M	A simple and efficient 1-D macroscopic model for shape memory alloys considering ferro-elasticity effect. *Smart Structures and*	2016	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Shakeri.	*Systems, 16*(4): 641-65. DOI: 10.12989/sss.2015.16.4.641				
	3.5-2#	2015				A.R. Damanpack, **W.H. Liao***, M.M. Aghdam, M. Shakeri, M. Bodaghi	Micro–macro thermo-mechanical analysis of axisymmetric shape memory alloy composite cylinders. *Composite Structures, 131*: 1001–1016.	2015	Yes	Yes	Yes
	3.6-6#	2016				Eugeny A. Ermilov,* Jian-Yong Liu, Roel Menting, Ying-Si Huang, Beate Röder & **Dennis K. P. Ng***	An artificial photosynthetic model based on a molecular triad of boron dipyrromethene and phthalocyanine, *Phys. Chem. Chem. Phys., 18*: 10964-75. DOI: 10.1039/c6cp00920d	2016	Yes	Yes	Yes
	3.7-4#	2016				Zhuofeng Hu, Gang Liu, Xingqiu Chen, Zhurui Shen* & **Jimmy C. Yu***	Enhancing charge separation in metallic photocatalysts: A case study of the conducting molybdenum dioxide. *Advanced Functional Materials, 26*(25): 4445 - 55. DOI: 10.1002/adfm.201600239	2017	Yes	Yes	Yes
	3.8-6#	2016				Zhuofeng Hu, Zhurui Shen* & **Jimmy C. Yu***	Covalent fixation of surface oxygen atoms on hematite photoanode for enhanced water oxidation. *Chemistry of Materials, 28*(2): 564-72. DOI: 10.1021/acs.chemmater.5b04058	2016	Yes	Yes	No
	3.9-4#	2017				Zhuofeng Hu, Zhurui Shen* & **Jimmy C. Yu***	Converting carbohydrates to carbon-based photocatalysts for environmental treatment. *Environmental Science & Technology, 51*(12): 7076 - 83. DOI: 10.1021/acs.est.7b00118	2017	Yes	Yes	Yes
	3.10-4#	2017				Zhuofeng Hu, Zhurui Shen* & **Jimmy C. Yu***	Phosphorus containing materials for photocatalytic hydrogen evolution. *Green Chemistry, 19*(3): 588 - 613. DOI:	2017	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
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							10.1039/c6gc02825j				
	3.11-4#	2017				Zhuofeng Hu, Zhurui Shen*, **Jimmy C. Yu*** & Fangyi Cheng*	Intrinsic defect based homojunction: A novel quantum dots photoanode with enhanced charge transfer kinetics. *Applied Catalysis B-Environmental, 203*: 829 - 38. DOI: 10.1016/j.apcatb.2016.10.079	2017	Yes	Yes	Yes
	3.12-2#	2015				Zhuofeng Hu, Mingkun Xu, Zhurui Shen* & **Jimmy C. Yu***	A nanostructured chromium(III) oxide/tungsten(VI) oxide p–n junction photoanode toward enhanced efficiency for water oxidation. *J. Mater. Chem. A, 3*: 14046. DOI: 10.1039/c5ta02528a	2015	Yes	Yes	Yes
	3.13-2	2015				Zhuofeng Hu, **Jimmy C. Yu**, Tian Ming & **Jianfang Wang***	A wide-spectrum-responsive TiO_2 photoanode for photoelectrochemical cells. *Applied Catalysis B: Environmental, 168-169*: 483–489. http://dx.doi.org/10.1016/j.apcatb.2015.01.018	2015	Yes	Yes	Yes
	3.14-6#	2016				Zhuofeng Hu, Luyan Yuan, Zhifeng Liu, Zhurui Shen*, & **Jimmy C. Yu***	An elemental phosphorus photocatalyst with a record high hydrogen evolution efficiency. *Angewandte Chemie, 55*: 9580-5. DOI: 10.1002/anie.201603331	2016	Yes	Yes	Yes
	3.15-4#	2017				Henglei Jia, Xiao-Ming Zhu, Ruibin Jiang & **Jianfang Wang***	Aerosol-sprayed gold/ceria photocatalyst with superior plasmonic hot electron-enabled visible-light activity. *Applied Materials & Interfaces, 9*: 2560 – 71. DOI: 10.1021/acsami.6b15184	2017	Yes	Yes	Yes
	3.16-4#	2016				Ruibin Jiang, Feng Qin, Yejing Liu, Xing Yi Ling, Jun Guo, Minghua Tang, Si	Colloidal gold nanocups with orientation-dependent plasmonic properties. *Advanced Materials, 28*: 6322 – 31. DOI: 10.1002/adma.201601442	2017	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Cheng & **Jianfang Wang***					
	3.17-4	2016				Zexun Jin, Zhuofeng Hu, **Jimmy C. Yu*** & **Jianfang Wang**	Room temperature synthesis of a highly active Cu/Cu_2O photocathode for photoelectrochemical water splitting. *Journal of Materials Chemistry A, 4*(36): 13736 - 41. DOI: 10.1039/c6ta05274f	2017	Yes	Yes	Yes
	3.18-4	2017				Zexun Jin, Yecheng Li & **Jimmy C. Yu***	Gaining hands-on experience with solid-state photovoltaics through constructing a novel n-Si/CuS solar Cell. *Journal of Chemical Education, 94(*4): 476 - 9. DOI: 10.1021/acs.jchemed.6b00617	2017	Yes	Yes	No
	3.19-5#	2017				Lin Jing, Ruixue Zhu, David Lee Phillips & **Jimmy C. Yu***	Effective Prevention of Charge Trapping in Graphitic Carbon Nitride with Nanosized Red Phosphorus Modification for Superior Photo(electro)catalysis. *Advanced Functional Materials, 27*(46). DOI: 10.1002/adfm.201703484	2018	Yes	Yes	Yes
	3.20-2#	2015				Long Kuai*, Junxin Wang*, Tian Ming*, Caihong Fang, Zhenhua Sun, Baoyou Geng & **Jianfang Wang**.	Aerosol-spray diverse mesoporous metal oxides from metal nitrates. *Scientific Reports, 5*:9923. DOI: 10.1038/srep09923	2015	Yes	Yes	Yes
	3.21-4#	2017				Hao Li, Feng Qin, Zhiping Yang, Ximin Cui, **Jianfang Wang*** & Lizhi Zhang*	New reaction pathway induced by plasmon for selective benzyl alcohol oxidation on BiOCl possessing oxygen vacancies, *Journal of the American Chemical Society, 139*: 3513 – 21. DOI: 10.1021/jacs.6b12850	2017	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	3.22-2	2015				Yecheng Li, Lei Zhang, Zhuofeng Hu & **Jimmy C. Yu***	Synthesis of 3D structured graphene as a high performance catalyst support for methanol electro-oxidation. *Nanoscale, 7*(25): 10896. DOI: 10.1039/c5nr02766g	2015	Yes	Yes	Yes
	3.23-1#	2014				Junrui Liang*, Henry Shu-Hung Chung & **Wei-Hsin Liao***	Dielectric loss against piezoelectric power harvesting. *Smart Materials and Structures, 23*(9): 092001 (8pp). DOI: 10.1088/0964-1726/23/9/092001	2014	Yes	Yes	Yes
	3.24-6#	2016				Shenghua Liu, Ruibin Jiang, Peng You, Xingzhong Zhu, **Jianfang Wang** & Feng Yan*	Au/Ag core–shell nanocuboids for high-efficiency organic solar cells with broadband plasmonic enhancement. *Energy & Environmental Science, 9*: 898-905. DOI: 10.1039/c5ee03779d	2016	Yes	Yes	Yes
	3.25-1#	2014				Zhurui Shen, Zhuofeng Hu, Wanjun Wang, Siu-Fung Lee, Donald K. L. Chan, Yecheng Li, Ting Gu & **Jimmy C. Yu***	Crystalline phosphorus fibers: Controllable synthesis and visible-light-driven photocatalytic activity. *Nanoscale, 6:* 14163 - 14167. DOI: 10.1039/C4NR04250F	2014	Yes	Yes	Yes
	3.26-2#	2015				Zhurui Shen, Shoutian Sun, Wanjun Wang, Jianwen Liu, Zhifeng Liu & **Jimmy C. Yu***	A black–red phosphorus heterostructure for efficient visible-light-driven photocatalysis. *J. Mater. Chem. A, 3*: 3285. DOI: 10.1039/c4ta06871h	2015	Yes	Yes	Yes
	3.27-4#	2017				Wen-Jing Shi, Takumi Kinoshita* & **Dennis K. P. Ng***	Push–pull distyryl boron dipyrromethenes as near-infrared sensitizers for dye-sensitized solar cells. *Asian Journal of Organic Chemistry*, *6*: 1476-1485. DOI: 10.1002/ajoc.201700282	2018	Yes	Yes	Yes
	3.28	2017				Wen-Jing Shi, Takumi	Ethynyl-linked donor-π-acceptor boron	2017	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	-4#					Kinoshita* & **Dennis K. P. Ng***	dipyrromethenes for panchromatic dye-sensitized solar cells. *Asian Journal of Organic Chemistry*, *6*: 758 - 767. DOI: 10.1002/ajoc.201700121				
	3.29-6#	2016				Hao Tang, Kunpeng Dou, Yucheng Xiong, Feng Wang, Yang Zhao, Xiaomeng Wang, Qiang Fu, Juekuan Yang, Ni Zhao and **Dongyan Xu***	Unusual thermal transport behavior in self-assembled fullerene *Nanorods. RSC Adv.*, *6*: 67509-13. DOI: 10.1039/c6ra14042d	2016	Yes	Yes	Yes
	3.30-6#	2016				Hao Tang, Yucheng Xiong, Fengshuo Zu, Yang Zhao, Xiaomeng Wang, Qiang Fu, Jiansheng Jie, Juekuan Yang* and **Dongyan Xu***	Length-dependent thermal transport in one-dimensional self-assembly of planar π-conjugated molecules. *Nanoscale*, *8*: 11932-9. DOI: 10.1039/c5nr09043a	2016	Yes	Yes	Yes
	3.31-6#	2016				Yan-Jun Wan, Wen-Hu Yang, Shu-Hui Yu, Rong Sun, **Ching-Ping Wong** & **Wei-Hsin Liao***	Covalent polymer functionalization of graphene for improved dielectric properties and thermal stability of epoxy composites. *Composites Science and Technology, 122*: 27-35. DOI: 10.1016/j.compscitech.2015.11.005	2016	Yes	Yes	Yes
	3.32-6#	2016				Yan-Jun Wan, Shu-Hui Yu, Wen-Hu Yang, Peng-Li Zhu, Rong Sun*,	Tuneable cellular-structured 3D graphene aerogel and its effect on electromagnetic interference shielding performance and mechanical properties of epoxy composites.	2016	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Ching-Ping Wong & **Wei-Hsin Liao***	*RSC Advances, 6*: 56589-98. DOI: 10.1039/c6ra09459g				
	3.33-5#	2018				Yan-Jun Wan, Peng-Li Zhu, Shu-Hui Yu, Rong Sun*, **Ching-Ping Wong** & **Wei-Hsin Liao***	Anticorrosive, ultralight, and flexible carbon-wrapped metallic nanowire hybrid sponges for highly efficient electromagnetic interference shielding. *Small, 14*(27): 1800534. DOI: 10.1002/smll.201800534	2018	Yes	Yes	No
	3.34-5#	2017				Yan-Jun Wan, Peng-Li Zhu, Shu-Hui Yu, Rong Sun*, **Ching-Ping Wong** & **Wei-Hsin Liao***	Graphene paper for exceptional EMI shielding performance using large-sized graphene oxide sheets and doping strategy. *Carbon, 122*: 74-81. DOI: 10.1016/j.carbon.2017.06.042	2018	Yes	Yes	Yes
	3.35-4#	2017				Yan-Jun Wan, Peng-Li Zhu, Shu-Hui Yu, Rong Sun*, **Ching-Ping Wong** & **Wei-Hsin Liao***	Ultralight, super-elastic and volume-preserving cellulose fiber/graphene aerogel for high-performance electromagnetic interference shielding. *Carbon, 115*: 629 - 39. DOI: 10.1016/j.carbon.2017.01.054	2017	Yes	Yes	Yes
	3.36-4	2017				Yan-Jun Wan, Peng-Li Zhu, Shu-Hui Yu, Wen-Hu Yang, Rong Sun*, **Ching-Ping Wong** & **Wei-Hsin Liao***	Barium titanate coated and thermally reduced graphene oxide towards high dielectric constant and low loss of polymeric composites. *Composites Science and Technology, 141*: 48 - 55. DOI: 10.1016/j.compscitech.2017.01.010	2017	Yes	Yes	Yes
	3.37-1#	2014				Junxin Wang*, Tian Ming*, Zhao Jin, **Jianfang Wang**, Ling-Dong Sun & Chun-Hua Yan.	Photon energy upconversion through thermal radiation with the power efficiency reaching 16%. *Nature Communications, 5*: 5669. DOI: 10.1038/ncomms6669	2014	Yes	Yes	Yes
	3.38	2018				Wanjun Wang,	Free-standing red phosphorous/silver	2018	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	-5					Taicheng An*, Guiying Li, Yecheng Li, **Jimmy C. Yu*** & Po Keung Wong	sponge monolith as an efficient and easily recyclable macroscale photocatalyst for organic pollutant degradation under visible light irradiation. *Journal of Colloid and Interface Science, 518*: 130–139. DOI: 10.1016/j.jcis.2018.02.008				
	3.39 -2#	2015				Wanjun Wang, Xingqiu Chen, Gang Liu, Zhurui Shena, Dehua Xia, Po Keung Wong & **Jimmy C. Yu***	Monoclinic dibismuth tetraoxide: A new visible-light-driven photocatalyst for environmental remediation. *Applied Catalysis B: Environmental*, 176–177: 444–453. DOI: 10.1016/j.apcatb.2015.04.026	2015	Yes	Yes	Yes
	3.40 -6	2016				Wanjun Wang, Yecheng Li, Zhiwen Kang, Feng Wang & **Jimmy C. Yu***	A NIR-driven photocatalyst based on alpha-NaYF4:Yb,Tm@TiO_2 core-shell structure supported on reduced graphene oxide. *Applied Catalysis B-Environmental, 182*: 184-92. DOI: 10.1016/j.apcatb.2015.09.022	2016	Yes	Yes	No
	3.41 -1	2014				Wanjun Wang, **Jimmy C. Yu***, Zhurui Shen, Donald K.L. Chan & Ting Gu.	g-C_3N_4 quantum dots: Direct synthesis, upconversion property and photocatalytic application. *Chemical Communications*, *50*(70): 10148-10150. DOI: 10.1039/C4CC02543A	2014	Yes	Yes	Yes
	3.42 -2#					Dehua Xia, Zhurui Shen, Guocheng Huang, Wanjun Wang, **Jimmy C. Yu*** & Po Keung Wong.	Red phosphorus: An earth-abundant elemental photocatalyst for “green” bacterial inactivation under visible light. *Environ. Sci. Technol., 49*: 6264−6273. DOI: 10.1021/acs.est.5b00531	2015	Yes	Yes	Yes
	3.43 -5#	2018				Jianhua Yang, Yanzhen Guo, Ruibin	High-efficiency “working-in-tandem” nitrogen photofixation achieved by	2018	Yes	Yes	No

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Jiang*, Feng Qin, Han Zhang, Wenzheng Lu, **Jianfang Wang*** & **Jimmy C. Yu**	assembling plasmonic gold nanocrystals on ultrathin titania nanosheets. *J. Am. Chem. Soc., 140* (27): 8497–8508. DOI: 10.1021/jacs.8b03537				
	3.44-6#	2015				Juekuan Yang, Hao Tang, Yang Zhao, Yin Zhang, Jiapeng Li, Zhonghua Ni, Yunfei Chen & **Dongyan Xu***	Thermal conductivity of zinc blende and wurtzite CdSe nanostructures, *Nanoscale, 7*: 16071-8. DOI: 10.1039/c5nr04117a	2016	Yes	Yes	No
	3.45-6	2015				Lei Zhang, Yecheng Li, Zexun Jin, King Ming Chan & **Jimmy C Yu***	Mesoporous carbon/CuS nanocomposites for pH-dependent drug delivery and near-infrared chemo-photothermal therapy. *RSC Adv, 5*(113): 93226 - 33. DOI: 10.1039/c5ra19458j	2016	Yes	Yes	Yes
	3.46-4	2016				Lei Zhang, Yecheng Li, **Jimmy C. Yu*** & King Ming Chan	Redox-responsive controlled DNA transfection and gene silencing based on polymer-conjugated magnetic nanoparticles. *RSC Advances, 6*(76): 72155 - 64. DOI: 10.1039/c6ra16578h	2017	Yes	Yes	Yes
	3.47-6#	2015				Shouren Zhang, Ruibin Jiang, Ya-Ming Xie, Qifeng Ruan, Baocheng Yang*, **Jianfang Wang*** & Hai-Qing Lin*	Colloidal moderate-refractive-index Cu2O nanospheres as visible-region nanoantennas with electromagnetic resonance and directional light-scattering properties. *Adv Mat, 27*: 7432 - 9. DOI: 10.1002/adma.201502917.	2016	Yes	Yes	Yes
	3.48-6#	2016				Wenhua Zhang*, Juekuan Yang* &	A high power density micro-thermoelectric generator fabricated by an integrated	2016	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Dongyan Xu*	bottom-up approach. *Journal of Microelectromechan. Syst. 25*: 744-9. DOI: 10.1109/JMEMS.2016.2565504				
	3.49 -4#	2015				Aijun Zhou, Qiang Fu, Wenhua Zhang, Bin Yang, Jingze Li, Pawel Ziolkowski, Eckhard Mueller & **Dongyan Xu***	Enhancing the thermoelectric properties of the electroplated Bi_2Te_3 films by tuning the pulse off-to-on ratio. *Electrochimica Acta, 178*: 217-24. DOI: 10.1016/j.electacta.2015.07.164	2015	Yes	Yes	Yes
	3.50 -6#	2016				Aijun Zhou*, Weihang Wang, Xu Yao, Bin Yang, Jingze Li, Qiang Zhao, Chao Wang, **Dongyan Xu**, Pawel Ziolkowski* and Eckhard Mueller	Impact of the film thickness and substrate on the thermopower measurement of thermoelectric films by the potential-Seebeck microprobe (PSM). *Appl. Therm. Eng., 107*: 552 - 9. DOI: 10.1016/j.applthermaleng.2016.05.037	2016	Yes	Yes	Yes
	3.51 -2#	2015				Xiaolu Zhuo, Xingzhong Zhu, Qian Li, Zhi Yang* & **Jianfang Wang**.	Gold nanobipyramid-directed growth of length-variable silver nanorods with mMultipolar plasmon resonances. *ACS Nano, 9*(7): 7523–7535.	2015	Yes	Yes	Yes
	3.52 -6#	2018				Wenhua Zhang, Juekuan Yang and **Dongyan Xu***	Development and optimization of high power density microthermoelectric Generators. *Journal of Physics: Conference Series, 1052*(1): 012009. DOI:10.1088/1742-6596/1052/1/012009.	2018	Yes	Yes	Yes
	3.53 -6#	2018				Xiao-Fei Chen, Mohamed E. El-Khouly*, Kei Ohkubo, Shunichi Fukuzumi*,	Assemblies of Boron Dipyrromethene/Porphyrin, Phthalocyanine, and C60 Moieties as Artificial Models of Photosynthesis:	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						and **Dennis K. P. Ng***	Synthesis, Supramolecular Interactions, and Photophysical Studies. *Chemistry–A European Journal, 24*(15), 3862-3872. DOI: 10.1002/chem.201705843.				
	3.54-6#	2018				Lin Jing, Wee-Jun Ong, Rui Zhang, Emma Pickwell-MacPherson, **Jimmy C. Yu***	Graphitic carbon nitride nanosheet wrapped mesoporous titanium dioxide for enhanced photoelectrocatalytic water splitting. *Catalysis Today, 315*, 103-109. DOI: 10.1016/j.cattod.2018.04.007.	2018	Yes	Yes	Yes
	3.55-6#	2018				Wanjun Wang, Guiying Li, Taicheng An*, Donald K.L. Chan, **Jimmy C. Yu***, Po Keung Wong	Photocatalytic hydrogen evolution and bacterial inactivation utilizing sonochemical-synthesized g-C_3N_4/red phosphorus hybrid nanosheets as a wide-spectral-responsive photocatalyst: The role of type I band alignment. *Applied Catalysis B: Environmental, 238*, 126-135. DOI: 10.1016/j.apcatb.2018.07.004.	2018	Yes	Yes	Yes
	3.56-6#	2019				Yang Liu, Zhuofeng Hub, **Jimmy C. Yu***	Liquid bismuth initiated growth of phosphorus microbelts with efficient charge polarization for photocatalysis. *Applied Catalysis B: Environmental, 247*, 100-106. DOI: 10.1016/j.apcatb.2019.01.092.	2018	Yes	Yes	Yes
ST4	4.1-5	2017				Hongning Chen, Nien-Chu Lai & **Yi-Chun Lu***	Silicon−carbon nanocomposite semi-solid negolyte and its application in redox flow batteries. *Chem. Mater., 29*: 7533−7542. DOI: 10.1021/acs.chemmater.7b02561	2018	Yes	Yes	Yes
	4.2-6	2015				Hongning Chen & **Yi-Chun Lu***	A high-energy-density multiple redox semi-solid-liquid flow battery, *Adv Energy Mat,*	2016	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
							6: 1502183. DOI: 10.1002/aenm.201502183				
	4.3-2	2015				Hongning Chen, Qingli Zou, Zhuojian Liang, Hao Liu, Quan Li & **Yi-Chun Lu***	Sulphur-impregnated flow cathode to enable high-energy-density lithium flow batteries. *Nature Communications, 5*:5877, DOI: 10.1038/ncomms6877.	2015	Yes	Yes	Yes
	4.4-2	2015				Jizhang Chen, Junling Xu, Shuang Zhou, **Ni Zhao*** & **Ching-Ping Wong***	Template-grown graphene/porous Fe_2O_3 nanocomposite: A high-performance anode material for pseudocapacitors. *Nano Energy, 15*: 719–728. DOI: 10.1016/j.nanoen.2015.05.021	2015	Yes	Yes	Yes
	4.5-6	2015				Jizhang Chen, Junling Xu, Shuang Zhou, **Ni Zhao*** & **Ching-Ping Wong***	Facile and scalable fabrication of three-dimensional $Cu(OH)_2$ nanoporous nanorods for solid-state supercapacitors. *J Mater Chem A*, DOI: 10.1039/C5TA04164C	2015	Yes	Yes	Yes
	4.6-6	2016				Jizhang Chen, Junling Xu, Shuang Zhou, **Ni Zhao*** & **Ching-Ping Wong***	Amorphous nanostructured FeOOH and Co-Ni double hydroxides for high-performance aqueous asymmetric supercapacitors. *Nano Energy, 21*: 145-53. DOI: 10.1016/j.nanoen.2015.12.029	2016	Yes	Yes	Yes
	4.7-6	2016				Jizhang Chen, Junling Xu, Shuang Zhou, **Ni Zhao*** & **Ching-ping Wong***	Nitrogen-doped hierarchically porous carbon foam: A free-standing electrode and mechanical support for high-performance supercapacitors. *Nano Energy, 25*: 193-202. DOI: 10.1016/j.nanoen.2016.04.037	2016	Yes	Yes	No
	4.8-4#	2017				Jizhang Chen*, Xiaoyan Zhou, Changtong Mei, Junling Xu & **Ching-**	Improving the sodiation performance of $Na_2Ti_3O_7$ through Nb-doping. *Electrochimica Acta, 224*: 446 - 51. DOI: 10.1016/j.electacta.2016.12.094	2017	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Ping Wong*					
	4.9-4#	2016				Jizhang Chen*, Xiaoyan Zhou, Changtong Mei, Junling Xu, Shuang Zhou & **Ching-Ping Wong**	Pyrite FeS_2 nanobelts as high-performance anode material for aqueous pseudocapacitor. *Electrochimica Acta, 222*: 172 - 6. DOI: 10.1016/j.electacta.2016.10.181	2017	Yes	Yes	No
	4.10-4#	2017				Jizhang Chen*, Xiaoyan Zhou, Changtong Mei, Junling Xu, Shuang Zhou & **Ching-Ping Wong**	Evaluating biomass-derived hierarchically porous carbon as the positive electrode material for hybrid Na-ion capacitors. *J of Power Sources, 342*: 48 - 55. DOI: 10.1016/jjpowsour.2016.12.034	2017	Yes	Yes	No
	4.11-5#	2018				Qiongyu Chen, Jizhang Chen*, Yuyang Zhou, Chao Song, Qinghua Tian, Junling Xu & **Ching-Ping Wong**	Enhancing pseudocapacitive kinetics of nanostructured MnO_2 through anchoring onto biomass-derived porous carbon. *Applied Surface Science, 440*: 1027–1036. DOI: 10.1016/j.apsusc.2018.01.224	2018	Yes	Yes	Yes
	4.12-4	2017				Guangtao Cong, Yucun Zhou, Zhejun Li & **Yi-Chun Lu***	A highly concentrated catholyte enabled by a low-melting-point ferrocene derivative. *ACS Energy Letters, 2*(4): 869 - 75. DOI: 10.1021/acsenergylett.7b00115	2017	Yes	Yes	Yes
	4.13-4#	2017				Cuiping Han, Yan-Bing He, Ming Liu, Baohua Li*, Quan-Hong Yang, **Ching-Ping Wong*** & Feiyu Kang	A review of gassing behavior in $Li_4Ti_5O_{12}$-based lithium ion batteries. *J of Materials Chemistry A, 5*(14): 6368 - 81. DOI: 10.1039/c7ta00303j	2017	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	4.14-4	2016				Zhejun Li, Guoming Weng, Qingli Zou, Guangtao Cong & **Yi-Chun Lu***	A high-energy and low-cost polysulfide/iodide redox flow battery. *Nano Energy, 30*: 283 - 292. DOI: 10.1016/j.nanoen.2016.09.043	2017	Yes	Yes	Yes
	4.15-4	2016				Zhuojian Liang & **Yi-Chun Lu***	Critical role of redox mediator in suppressing charging instabilities of lithium-oxygen batteries. *J of The American Chemical Society, 138*(24): 7574 - 83. DOI: 10.1021/jacs.6b01821	2017	Yes	Yes	No
	4.16-5#	2018				Qi Liu, Zhen Geng, Cuiping Han, Yongzhu Fu*, Song Li, Yan-bing He, Feiyu Kang & Baohua Li*	Challenges and perspectives of garnet solid electrolytes for all solid-state lithium batteries. *J of Power Sources, 389*: 120-34. DOI: 10.1016/j.jpowsour.2018.04.019	2018	Yes	Yes	Yes
	4.17-5	2018				Ruiying Shi, Cuiping Han*, Xiaofu Xu, Xiaoying Qin, Lei Xu, Hongfei Li, Juanqin Li, **Ching-Ping Wong** & Baohua Li*	Electrospun n-doped hierarchical porous carbon nanofiber with improved degree of graphitization for high-performance lithium ion capacitor. *Chemistry: A European Journal.* Vol & pagination not yet available. DOI: 10.1002/chem.201801345	2018	Yes	Yes	Yes
	4.18-6	2019				Junling Xu , Jizhang Chen , Li Tao , Zhilin Tian , Shuang Zhou , **Ni Zhao ***, **Ching-Ping Wong***	Investigation of $Na_3V_2(PO_4)_2O_2F$ as a sodium ion battery cathode material: Influences of morphology and voltage window. Nano Energy, 60, 510-519. DOI: https://doi.org/10.1016/j.nanoen.2019.03.063	2019	Yes	Yes	Yes
	4.19-6	2016				Yu Wang, Zhuojian Liang, Qingli Zou, Guangtao Gong & **Yi-**	Mechanistic insights into catalyst-assisted nonaqueous oxygen evolution reaction in lithium-oxygen batteries. *J of Physical*	2016	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Chun Lu*	*Chemistry C, 120*(12): 6459 - 66. DOI: 10.1021/acs.jpcc.6b00984				
	4.20-6	2019				Zengyue Wang, Long-Yin Simon Tam & **Yi-Chun Lu**	Flexible solid flow electrodes for high energy scalable energy storage. *Joule*. DOI: 10.1016/j.joule.2019.05.015.	2018	Yes	Yes	Yes
	4.21-4	2017				Guo-Ming Weng, Zhejun Li, Guangtao Cong, Yucun Zhou & **Yi-Chun Lu***	Unlocking the capacity of iodide for high-energy-density zinc/polyiodide and lithium/polyiodide redox flow batteries. *Energy & Environmental Science, 10*(3): 735 - 41. DOI: 10.1039/c6ee03554j	2017	Yes	Yes	No
	4.22-4#	2016				Binghe Xie, Yang Wang, Wenhui Lai, Wei Lin, Ziyin Lin, Zhexu Zhang, Peichao Zou, Yang Xu, Shuang Zhou, Cheng Yang*, Feiyu Kang & **Ching-Ping Wong***	Laser-processed graphene based micro-supercapacitors for ultrathin, rollable, compact and designable energy storage components. *Nano Energy, 26*: 276 - 285. DOI: 10.1016/j.nanoen.2016.04.045	2017	Yes	Yes	No
	4.23-4#	2016				Chao Xu, Jie Liao, Cheng Yang*, Ruozheng Wang, Dang Wu, Peichao Zou, Ziyin Lin, Baohua Li, Feiyu Kang & **Ching-Ping Wong***	An ultrafast, high capacity and superior longevity Ni/Zn battery constructed on nickel nanowire array film. *Nano Energy, 30*: 900 - 8. DOI: 10.1016/j.nanoen.2016.07.035	2017	Yes	Yes	No
	4.24-5	2018				Junling Xu, Jizhang Chen, Shuang Zhou, Cuiping Han, Mengjie	Sequentially-processed $Na_3V_2(PO_4)_3$ for cathode material of aprotic sodium ion battery. *Nano Energy, 50*: 323-30. DOI:	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Xu, **Ni Zhao*** & **Ching-Ping Wong***	10.1016/j.nanoen.2018.05.015				
	4.25-5	2018				Lei Xu, Ruiying Shi, Hongfei Li, Cuiping Han*, Mengyao Wu, **Ching-Ping Wong**, Feiyu Kang & Baohua Li*	Pseudocapacitive anthraquinone modified with reduced graphene oxide for flexible symmetric all-solid-state supercapacitors. *Carbon, 127*: 459-68. DOI: 10.1016/j.carbon.2017.11.003	2018	Yes	Yes	Yes
	4.26-4	2016				Shuang Zhou, Linkai Li, Hui Yu, Jizhang Chen, **Ching-Ping Wong*** & **Ni Zhao***	Thin film electrochemical capacitors based on organolead triiodide perovskite. *Advanced Electronic Materials, 2*(7): 1600114. DOI: 10.1002/aelm.201600114	2017	Yes	Yes	Yes
	4.27-6	2015				Shuang Zhou, Junling Xu, Yubin Xiao, **Ni Zhao*** & **Ching-Ping Wong***.	Low-temperature Ni particle-templated chemical vapor deposition growth of curved graphene for supercapacitor applications. *Nano Energy 13*: 458–466. DOI: 10.1016/j.nanoen.2015.03.010	2015	Yes	Yes	Yes
	4.28-6	2016				Qingli Zou & **Yi-Chun Lu***	Solvent-dictated lithium sulfur redox reactions: An operando UV-vis spectroscopic study. *J of Physical Chemistry Letters, 7*(8): 1518 - 25. DOI: 10.1021/acs.jpclett.6b00228	2016	Yes	Yes	Yes
	4.29-6#	2018				Ruiying Shi, **Cuiping Han***, Hongfei Li, Lei Xu, Tengfei Zhang, Junqin Li, Zhiqun Lin, Ching-Ping Wong, Feiyu Kang and **Baohua Li***	NaCl-templated synthesis of hierarchical porous carbon with extremely large specific surface area and improved graphitization degree for high energy density lithium ion capacitors. *J. Mater. Chem. A*, 2018, 6, 17057–17066. DOI: 10.1039/c8ta05853a	2018	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	4.30-6	2018				Cuiping Han, Lei Xu , Hongfei Li, Ruiying Shi, Tengfei Zhang , **Junqin Li*** , Ching-Ping Wong, Feiyu Kang , Zhiqun Lin, **Baohua Li ***	Biopolymer-assisted synthesis of 3D interconnected Fe_3O_4@carbon core@shell as anode for asymmetric lithium ion capacitors. *Carbon*, 140, 295-305. DOI: https://doi.org/10.1016/j.carbon.2018.09.010	2018	Yes	Yes	Yes
ST5	**Energy Generation Scheduling**										
	5.1-1#	2014				Jose Camacho*, Ying Zhang*, **Minghua Chen*** & **Dah Ming Chiu***	Balance your bids before your bits: The economics of geographic load-balancing, in Proceedings of the *Fifth International Conference on Future Energy Systems (ACM e-Energy)*, Cambridge, UK, June 11-13, 2014. DOI: 10.1145/2602044.2602068	2014	Yes	Yes	Yes
	5.2-4#	2016				Chi-Kin Chau*, Guanglin Zhang* & **Minghua Chen***	Cost minimizing online algorithms for energy storage management with worst-case guarantee. *IEEE Transactions on Smart Grid,* 7(6): 2691. DOI: 10.1109/TSG.2016.2514412	2017	Yes	Yes	Yes
	5.3-5#	2018				Lei Deng*, Mohammad H. Hajiesmaili*, **Minghua Chen*** & Haibo Zeng*	Energy-efficient timely transportation of long-haul heavy-duty trucks. *IEEE Transactions on Intelligent Transportation Systems,* 19(7): 2099-2113. DOI: 10.1109/TITS.2017.2749262	2018	Yes	Yes	Yes
	5.4-6#	2015				Chuansheng Dong*, Haibo Zeng* & **Minghua Chen***	Online algorithms for automotive idling reduction with effective statistics. *IEEE Trans. on Computer-Aided Design of Integrated Circuits and Systems*, *34*(11): 1742-55. (Special Section on	2015	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
							Automotive Embedded Systems and Software) DOI: 10.1109/TCAD.2015.2469779				
	5.5-6#	2014				Qiuyu Peng, **Minghua Chen**, Anwar Walid & Steven Low*	Energy efficient multipath TCP for mobile devices. *MobiHoc '14 Proceedings of the 15th ACM international symposium on Mobile ad hoc networking and computing*, August 11–14, 2014, Philadelphia, PA, USA. DOI: 10.1145/2632951.2632971	2015	Yes	Yes	No
	5.6-4#		2017			Hanling Yi, Mohammad H. Hajiesmaili, Ying Zhang, **Minghua Chen*** & Xiaojun Lin*	Impact of the uncertainty of distributed renewable generation on deregulated electricity supply chain. *IEEE Transactions on Smart Grid,* Vol & pagination not yet available. DOI: 10.1109/TSG.2017.2705289	2017	Yes	Yes	Yes
	5.7-6#	2014				Shaoquan Zhang, Longbo Huang, **Minghua Chen*** & Xin Liu*	Effect of Proactive Serving on User Delay Reduction in Service Systems. *SIGMETRICS'14*, June 16–20, 2014, Austin, Texas, USA. DOI: 10.1145/2591971.2592024	2015	Yes	Yes	No
	5.8-5#	2018				Ying Zhang, Mohammad H. Hajiesmaili, Sinan Cai **Minghua Chen*** & Qi Zhu	Peak-aware online economic dispatching for microgrids. *IEEE Transactions on Smart Grid*, 9(1): 323 - 335. DOI: 10.1109/TSG.2016.2551282.	2018	Yes	Yes	Yes
	5.9-6	2015				Ying Zhang, Mohammad Hassan Hajiesmaili & **Minghua Chen***	Peak-aware online economic dispatching for microgrids. *e-Energy '15 Proceedings of the 2015 ACM Sixth International Conference on Future Energy Systems*, e-	2015	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
							Energy'15, July 14 - 17, 2015, Bangalore, India. DOI: 10.1145/2768510.2768538				
	5.10-4#	2017				Shizhen Zhao*, Xiaojun Lin* & **Minghua Chen**	Robust online algorithms for peak-minimizing EV charging under multi-stage uncertainty. *IEEE Transactions on Automatic Control, 62*(11): 5739 - 54. DOI: 10.1109/TAC.2017.2699290	2018	Yes	Yes	Yes
	5.11-6#	2015				Shizhen Zhao, Xiaojun Lin* & **Minghua Chen***	Peak-minimizing online EV charging: Price-of-uncertainty and algorithm robustification, in *Proceedings of IEEE INFOCOM*, Hong Kong, Apr. 26 - May 1, 2015. DOI: 10.1109/INFOCOM.2015.7218621.	2015	Yes	Yes	Yes
	5.12-6#	2015				Ruiting Zhou*, Zongpeng Li*, Chuan Wu* & **Minghua Chen***	Demand response in smart grids: A randomized auction approach. *IEEE J on Selected Areas in Communications, 33*(12): 2540 - 53, DOI: 10.1109/JSAC.2015.2481208	2016	Yes	Yes	Yes
	<u>Demand Management</u>										
	5.13-4#		2017			Shahab Bahrami*, Vincent W.S. Wong* & **Jianwei Huang***	An online learning algorithm for demand response in smart grid. *IEEE Transactions on Smart Grid.* Vol & pagination not yet available. DOI: 10.1109/TSG.2017.2667599	2017	Yes	Yes	No
	5.14-6#	2015 Book Chapter				Liping Qian, Yuan Wu, **Ying Jun (Angela) Zhang** & **Jianwei Huang**	Demand response management via real-time electricity price control in smart grids, Book Chapter in Smart Grid: Networking, Data Management and Business Models, CRC Press. Pages 169-191. DOI:	2016	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
							10.1201/b19664-11 http://ncel.ie.cuhk.edu.hk/sites/default/files/demandresponse_chapter_2016.pdf				
	5.15-1	2014				Hao Wang* & **Jianwei Huang***	Hybrid renewable energy investment in microgrid. *IEEE SmartGridComm*, Venice, Italy, November, 2014. DOI: 10.1109/SmartGridComm.2014.7007713.	2014	Yes	Yes	Yes
	5.16-6	2015				Hao Wang* & **Jianwei Huang***	Bargaining-based energy trading market for interconnected microgrids, *IEEE ICC*, London, UK, 2015. DOI: 10.1109/ICC.2015.7248416.	2015	Yes	Yes	Yes
	5.17-4	2016				Hao Wang & **Jianwei Huang**	Incentivizing energy trading for interconnected microgrids. *IEEE Transactions on Smart Grid,* 9(4): 2647 - 2657. DOI: 10.1109/TSG.2016.2614988	2018	Yes	Yes	No
	5.18-4	2016				Hao Wang* & **Jianwei Huang***	Cooperative planning of renewable generations for interconnected microgrids. *IEEE Transactions on Smart Grid*, 7(5): 2486 - 96. DOI: 10.1109/TSG.2016.2552642	2017	Yes	Yes	Yes
	5.19-4	2017				Hao Wang* **Jianwei Huang***	Joint investment and operation of microgrid. *IEEE Transactions on Smart Grid,* 8(2): 833 - 45. DOI: 10.1109/TSG.2015.2501818	2017	Yes	Yes	Yes
	5.20-6#	2016				Hao Wang*, **Jianwei Huang***, Xiaojun Lin* & H Mohsenian-Rad*	Proactive demand response for data centers: A win-win solution. *IEEE Transactions on Smart Grid, 7*(3): 1584 - 96. DOI: 10.1109/TSG.2015.2501808	2015	Yes	Yes	Yes
	5.21-1#	2014				Wei Yuan*, **Jianwei**	Competitive charging station pricing for	2014	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Huang* & **Ying Jun (Angela) Zhang***	plug-in electric vehicles, *IEEE SmartGridComm*, Venice, Italy, November, 2014				
	5.22-5#	2017				Dongwei Zhao*, Hao Wang, **Jianwei Huang*** & Xiaojun Lin	Pricing-based Energy Storage Sharing and Virtual Capacity Allocation. *IEEE International Conference on Communications*, May 21-25, 2017, Paris, FRANCE	2018	Yes	Yes	Yes
	5.23-6#	2019				Shahab Bahrami, **Vincent W. S. Wong***, Jianwei Huang	Data Center Demand Response in Deregulated Electricity Markets. *IEEE Transactions on Smart Grid*, 10(3), 2820-2832. DOI: 10.1109/TSG.2018.2810830	2019	Yes	Yes	Yes
	Storage Management										
	5.24-4#	2017				Suzhi Bi* & **Ying Jun (Angela) Zhang***	Graph-based cyber security analysis of state estimation in smart Power Grid. *IEEE Communications Magazine, 55*(4): 176 - 183. DOI: 10.1109/MCOM.2017.1600210C	2017	Yes	Yes	Yes
	5.25-4	2017				Wanrong Tang* & **Ying Jun (Angela) Zhang***	A model predictive control approach for low-complexity electric vehicle charging scheduling: Optimality and scalability. *IEEE Transactions on Power Systems, 32*(2): 1050 - 63. DOI: 10.1109/TPWRS.2016.2585202	2017	Yes	Yes	Yes
	5.26-4#	2016				Wanrong Tang, Suzhi Bi* & **Ying Jun (Angela) Zhang**	Online charging scheduling algorithms of electric vehicles in smart grid: An overview. *IEEE Communications Magazine*, 54(12): 76 - 83. DOI: 10.1109/MCOM.2016.1600346CM	2017	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
	5.27-5	2017				Wanrong Tang∗, Suzhi Bi, **Ying Jun (Angela) Zhang∗** & Xiaojun Yuan	Joint routing and charging scheduling optimizations for smart-grid enabled electric vehicle networks. *IEEE 85th Vehicular Technology Conference* (VTC Spring), 4-7 June 2017, Sydney, NSW, Australia. DOI: 10.1109/VTCSpring.2017.8108290	2018	Yes	Yes	No
	5.28-4#	2017				Wei Yuan*, **Jianwei Huang*** & **Ying Jun Zhang***	Competitive charging station pricing for plug-in electric vehicles. *IEEE Transactions on Smart Grid,* 8(2): 627. DOI: 10.1109/TSG.2015.2504502	2017	Yes	Yes	Yes
	5.29-5	2018				Chaorui Zhang*, Jiayong Li, **Ying Jun (Angela) Zhang** & **Zhao Xu**	Optimal location planning of renewable distributed generation units in distribution networks: An analytical approach. *IEEE Transactions on Power Systems, 33*(3): 2742 - 53. DOI: 10.1109/TPWRS.2017.2749410	2018	Yes	Yes	Yes
	5.30-4#	2016				**Ying Jun (Angela) Zhang***, Changhong Zhao, Wanrong Tang & Steven H. Low	Profit-maximizing planning and control of battery energy storage systems for primary frequency control. *IEEE Transactions on Smart Grid, 9*(2): 712 - 23. DOI 10.1109/TSG.2016.2562672	2018	Yes	Yes	Yes
	5.31-6		2018			J. Li, C. Zhang, Z. Xu, J. Wang, J. Zhao & Ying Jun Zhang	Distributed transactive energy trading framework in distribution networks. *IEEE Transactions on Power Systems, 33*(6), 7215-7227. DOI: 10.1109/TPWRS.2018.2854649.	2018	Yes	Yes	Yes
	5.32-6#		2018			S. Wang, S. Bi & Ying Jun Zhang	Demand response management for profit maximizing energy loads in real-time	2018	Yes	Yes	Yes

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		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
							electricity market. Accepted in *IEEE Transactions on Power Systems*.				
	Smart Building Management										
	5.33-6	2015				**Lei Zhan*** & **Dah Ming Chiu***	Encouraging Energy Conservation in Campus Dormitory via Monitoring and Policies. *e-Energy '15 Proceedings of the 2015 ACM Sixth International Conference on Future Energy Systems*, July 14–17, 2015, Bangalore, India. DOI: 10.1145/2768510.2768516	2015	Yes	Yes	Yes
	5.34-6#	2019				**Qingyu Liu***, **Haibo Zeng*** , and **Minghua Chen***	Energy-Efficient Timely Truck Transportation for Geographically-Dispersed Tasks. *IEEE Transactions on Intelligent Transportation Systems. DOI: 10.1109/TITS.2019.2949267*	2018	Yes	Yes	Yes
	5.35-6#		2018			**Ying Zhang***, Lei Deng, Minghua Chen, Peijian Wang	Joint Bidding and Geographical Load Balancing for Datacenters: Is Uncertainty a Blessing or a Curse? Accepted for publication in *IEEE/ACM Transactions on Networking, 26(3), 1049-1062.* DOI: 10.1109/TNET.2018.2817525	2018	Yes	Yes	Yes
	5.36-6#		2017			H. Yi, M. Hajiesmaili, Y. Zhang, M. Chen, and X. Lin,	Impact of Uncertainty of Distributed Renewable Generation on Deregulated Electricity Supply Chain. *IEEE Transactions on Smart Grid, 9*(6), 6183-6193. DOI: 10.1109/TSG.2017.2705289.	2017	Yes	Yes	Yes
	5.37-6#	2018				Shuoyao Wang, **Suzhi Bi***, Ying-Jun Angela Zhang, Jianwei Huang	Electrical Vehicle Charging Station Profit Maximization: Admission, Pricing, and Online Scheduling. *IEEE Transactions on*	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
							Sustainable Energy, VOL. 9, NO. 4. DOI: 10.1109/TSTE.2018.2810274				
	5.38-6#	2019				Dongwei Zhao, Hao Wang, **Jianwei Huang***, Xiaojun Lin	Controllable vs. Random: Renewable Generation Competition in a Local Energy Market. *IEEE International Conference on Communications*	2018	Yes	Yes	Yes
ST6	6.1-4#	2017				Yu Cai, Jin Lin, Can Wan* & Yonghua Song	A stochastic short-term operation model for an active distribution company considering network constraints and demand response. *Int Trans Electr Energ Syst,.27*: e2321. DOI: 10.1002/etep.2321	2017	Yes	Yes	No
	6.2-5#	2017				Zijian Cao, Jin Lin, Can Wan*, Yonghua Song, Gareth Taylor & Maozhen Li	Hadoop-based framework for big data analysis of synchronised harmonics in active distribution network. *IET Generation Transmission & Distribution, 11*(16): 3930-7.DOI: 10.1049/iet-gtd.2016.1723	2018	Yes	Yes	No
	6.3-6#	2016				Songjian Chai*, **Zhao Xu*** & Wai Kin Wong*	Optimal granule-based PIs construction for solar irradiance forecast. *IEEE Transactions on Power Systems, 31*(4): 3332-3. DOI: 10.1109/TPWRS.2015.2473097	2016	Yes	Yes	Yes
	6.4-4#	2016				Yingying Chen*, **Zhao Yang Dong*,** Ke Meng*, Fengji Luo*, **Zhao Xu*** & Kit Po Wong*	Collector system layout optimization framework for large-scale offshore wind farms. *IEEE Transactions on Sustainable Energy*, 7(4): 1398 – 1407. DOI: 10.1109/TSTE.2016.2549602	2017	Yes	Yes	Yes
	6.5-6#	2015				Youwei Jia, Yang Gao, **Zhao Xu**, Kit Po Wong, Loi Lei Lai,	Powering China's sustainable development with renewable energies: Current status and future trend. *Electric Power Components*	2015	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Yusheng Xue, **Zhao Yang Dong & David J. Hill**.	*and Systems, 43*(8-10): 1193-1204. DOI: 10.1080/15325008.2015.1009585.				
	6.6-4#	2017				Youwei Jia, Chun Sing Lai, **Zhao Xu*,** Songjian Chai & Kit Po Wong	Adaptive partitioning approach to self-sustained smart grid. *IET Generation, Transmission & Distribution, 11*(2): 485 – 94. DOI: 10.1049/iet-gtd.2016.1031	2017	Yes	Yes	No
	6.7-1#	2015				Youwei Jia*, Ke Meng* & **Zhao Xu***.	N-k induced cascading contingency screening. *IEEE Transactions on Power System, 30*(5): 2824-5. DOI: 10.1109/TPWRS.2014.2361723	2014	Yes	Yes	Yes
	6.8-4	2017				Youwei Jia* & **Zhao Xu***	A direct solution to biobjective partitioning problem in electric power networks. *IEEE Transactions on Power Systems, (32)*3: 2481 – 3. DOI: 10.1109/TPWRS.2016.2607638	2017	Yes	Yes	Yes
	6.9-6#	2016				Youwei Jia*, **Zhao Xu*,** Loi Lei Lai* & Kit Po Wong*	Risk-based power system security analysis considering cascading outages. *IEEE Transactions on Industrial Informatics, 12*(2): 872 - 82. DOI: 10.1109/TII.2015.2499718	2016	Yes	Yes	Yes
	6.10-1#	2014				Qing Li, **Zhao Xu*** & Li Yang	Recent advancements on the development of microgrids. *Journal of Modern Power Systems and Clean Energy, 2*(3): 206-211, DOI: 10.1007/s40565-014-0069-8	2014	Yes	Yes	No
	6.11-4	2017				Yujun Li & **Zhao Xu***	Coordinated control of wind farms and MTDC grids for system frequency support. Electric *Power Components and Systems, 45*(4): 451 – 64. DOI:	2017	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
							10.1080/15325008.2016.1264500				
	6.12-4#	2017				Yujun Li*, **Zhao Xu*** & Ke.Meng*	Optimal power sharing control of wind turbines. *IEEE Transactions on Power Systems, 32*(1): 824 – 5. DOI: 10.1109/TPWRS.2016.2549741	2017	Yes	Yes	Yes
	6.13-6	2015				Yujun Li, **Zhao Xu*, Hon Wing Ngan & Siu-Chung Wong**.	A novel topology design for integration of offshore wind farm via HVDC transmission. *Electric Power Components and Systems, 43*(8-10): 1100-1112. DOI: 10.1080/15325008.2015.1012768.	2015	Yes	Yes	No
	6.14-4#	2016				Fengji Luo, **Zhao Xu*,** Ke Meng & Zhao Yang Dong	Optimal operation scheduling for microgrid with high penetrations of solar power and thermostatically controlled loads. *Science and Technology for the Built Environment, 22*(6): 666 – 73. DOI: 10.1080/23744731.2016.1188652	2017	Yes	Yes	No
	6.15-6#	2015				Ke Meng*, **Zhao Yang Dong*, Zhao Xu*** & Steven R. Weller*	Cooperation-driven distributed model predictive control for energy storage systems. *IEEE Transactions on Smart Grid, 6*(6): 2583 - 5. DOI: 10.1109/TSG.2015.2449760	2016	Yes	Yes	Yes
	6.16-6	2014				Ming Niu, Can Wan & **Zhao Xu**.	A review on applications of heuristic optimization algorithms for optimal power flow in modern power systems. *Journal of Modern Power Systems and Clean Energy, 2*(4): 289-297. DOI 10.1007/s40565-014-0089-4.	2015	Yes	Yes	No
	6.17-4#	2018				Can Wan*, **Jin Lin**, Wangfang Guo &	Maximum uncertainty boundary of volatile distributed generation in active distribution	2018	Yes	Yes	Yes

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Yonghua Song	network. *IEEE Transactions on Smart Grid, 9*(4): 2930-42. DOI: 10.1109/TSG.2016.2623760				
	6.18-4#	2017				Can Wan*, Jin Lin, Yonghua Song, **Zhao Xu** & Guangya Yang	Probabilistic forecasting of photovoltaic generation: An efficient statistical approach. *IEEE Transactions on Power Systems, 32*(3): 2471 - 72. DOI: 10.1109/TPWRS.2016.2608740	2017	Yes	Yes	Yes
	6.19-4#	2017				Can Wan*, Jin Lin*, Jianhui Wang*, Yonghua Song* & **Zhao Yang Dong***	Direct quantile regression for nonparametric probabilistic forecasting of wind power generation. *IEEE Transactions on Power System, 32*(4): 2767-78. DOI: 10.1109/TPWRS.2016.2625101	2017	Yes	Yes	Yes
	6.20-4#	2017				Can Wan*, Ming Niu*, Yonghua Song* & **Zhao Xu***	Pareto optimal prediction intervals of electricity price. *IEEE Transactions on Power Systems, 32*(1): 817 – 9. DOI: 10.1109/TPWRS.2016.2550867	2017	Yes	Yes	No
	6.21-4#	2016				Can Wan*, Yonghua Song, **Zhao Xu*,** Guangya Yang, Arne Hejde Nielsen	Probabilistic wind power forecasting with hybrid artificial neural networks. *Electric Power Components and Systems, 44*(15): 1656 - 1668. DOI: 10.1080/15325008.2016.1198437	2017	Yes	Yes	No
	6.22-4#	2018				Can Wan*, Jianhui Wang*, Jin Lin*, Yonghua Song* & **Z.Y. Dong***	Nonparametric prediction intervals of wind power via linear programming. *IEEE Transactions on Power Systems, 33*(1): 1074 - 76. DOI: 10.1109/TPWRS.2017.2716658	2018	Yes	Yes	Yes
	6.23-6#	2015				Can Wan*, Jian Zhao*, Yonghua	Photovoltaic and solar power forecasting for smart grid energy management. *CSEE J*	2016	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Song*, **Zhao Xu*,** Jin Lin* & Zechun Hu*	*of Power and Energy Systems, 1*(4): 38 - 46. DOI: 10.17775/CSEEJPES.2015.00046				
	6.24-4	2017				Dongxiao Wang, Ke Meng, Xiaodan Gao, Colin Coates & **Zhaoyang Dong**	Optimal air-conditioning load control in distribution network with intermittent renewables. *J of Modern Power Systems and Clean Energy, 5*(1): 55 - 65. DOI: 10.1007/s40565-016-0254-z	2017	Yes	Yes	No
	6.25-6#	2016				Huaizhi Wang, Haofan Lin, Tao Yu, **Zhao Xu*** & Yateendra Mishra	Dynamic equivalent-based reliability evaluation of distribution systems with DGs. *IET Generation, Transmission & Distribution, 10*(10): 2285 – 94. DOI: 10.1049/iet-gtd.2015.0669	2016	Yes	Yes	No
	6.26-4#	2017				Xuetao Xing, Jin Lin, Can Wan* & Yonghua Song	Model predictive control of LPC-looped active distribution network with high penetration of distributed generation. *IEEE Transactions on Sustainable Energy, 8*(3): 1051 - 63. DOI: 10.1109/TSTE.2016.2647259	2017	Yes	Yes	Yes
	6.27-4#	2016				Tao Yu*, Lei Xi*, Bo Yang*, **Zhao Xu*** & Lin Jiang*	Multiagent stochastic dynamic game for smart generation control. *J of Energy Engineering, 142*(1). DOI: 10.1061/(ASCE)EY.1943-7897.0000275	2017	Yes	Yes	No
	6.28-4#	2016				Feng Zhang, **Zhao Xu*** & Ke Meng	Optimal sizing of substation-scale energy storage station considering seasonal variations in wind energy. *IET Generation, Transmission & Distribution, 10*(13): 3241 – 50. DOI: 10.1049/iet-gtd.2016.0012	2017	Yes	Yes	No
	6.29-6#	2015				Yu Zheng*, **Zhaoyang Dong*,** Shilin Huang,	Optimal integration of mobile battery energy storage in distribution system with	2016	Yes	Yes	No

	No.	The Latest Status of Publications				Author(s) *(denote the corresponding author with an asterisk*)*	Title and journal/book *(with the volume, pages and other necessary publishing details specified)*	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknow-ledged the support of RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
		Year of publication	Year of acceptance *(for paper accepted but not yet published)*	Under Review	Under Preparation *(optional)*						
						Ke Meng*, Fengji Luo*, Jie Huang* **& David Hill***	renewables. *J of Modern Power Systems and Clean Energy, 3*(4): 589 - 96. DOI: 10.1007/s40565-015-0134-y				
	6.30-5#	2019				Yufei He*, Minghao Wang* and **Zhao Xu***	Enhanced Voltage Regulation of AC Microgrids with Electric Springs. 2019 *IEEE Applied Power Electronics Conference and Exposition.* DOI: 10.1109/APEC.2019.8722149.	2019	Yes	Yes	Yes

Recognized International Conference(s) in Which Paper(s) Related to This Project was/were Delivered (Section 6.4(b) of Main Report)

[1]Abstract is not required by the organizer. The progamme showing the talk title is attached instead.
[2]Abstract is not required by the organizer.
[3] The funding source acknowledgement was made in the oral presentation slides.
[4] The funding source acknowledgement was not included due to the space limitation. It has been included in their journal submissions.

ST	No.	Month/Year/ Place	Title	Conference Name	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknowledged the support of the RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
Project-wide	0a	19 – 24 Jun 2016, Hong Kong	**Ching Ping Wong, Jianbin Xu, Ni Zhao & Yi-Chun Lu**. Smart solar energy: A report from the Hong Kong RGC Theme-Based Research Project	*Gordon Research Conference 2016*	2016	Yes	Yes	No
	1c	Aug 2015, Singapore	Jiangquan Mai, Tsz Ki Lau, **Xinhui Lu**, Morphology studies of thick-film ternary organic bulk heterojunction solar cells	*M3 2015 Conference*	2016	Yes	Yes	Yes
	1d	30 Jun – 6 Jul 2015, Beijing, China	**Xudong Xiao**. Copper-based chalcogenide compound semiconductors for photovoltaic applications	*2015 International Workshop on Emerging Functional Electronic Materials and Devices*	2017	Yes	Yes	Yes
	1e	13 – 16 Oct 2015, Hangzhou, China	**Xudong Xiao**. Grain boundary properties of CIGS solar cells	*The 5th International Workshop on Quantum Energy*	2017	Yes	Yes	Yes
	1f	29 Nov – 4 Dec 2015, Boston, USA	**Xudong Xiao**. Two-stage annealing strategy for high efficiency Cu_2ZnSnS_4 solar cell fabrication through sputtering and sulfurization	*2015 MRS Fall Meeting & Exhibit*	2017	Yes	Yes	Yes

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	1g	18 – 21 Jan 2016, Hong Kong	**Xudong Xiao**. Two-stage annealing strategy for high efficiency Cu_2ZnSnS_4 solar cell fabrication through sputtering and sulfurization	*EMN Meeting on Photovoltaics*	2016	Yes	Yes	Yes
	1i	2 – 5 Nov 2016, Wuhan, China	**Xudong Xiao**. Nanoscopic studies of Cu(InGa)Se2 grain boundaries	*Asia Communications and Photonics Conference (ACP 2016)*	2017	Yes	Yes	No
	1j	7 – 11 Nov 2016, Nashville, TN, USA	**Xudong Xiao**. Compositions, structures, and electronic properties of grain boundaries of Cu(InGa)Se2	*AVS 63rd International Symposium & Exhibition*	2017	Yes	Yes	No
	1k	29 Mar – 1 April 2017, Xi'An, China	**Xudong Xiao**. Optimization of the fabrication of functional layers in CIGS and CZTS solar cells	*China Photovoltaic Technology International Conference (CPTIC 2017)*	2017	Yes	Yes	No
	1l	30 May 2017, ZSW, Stuttgart, Germany	**Xudong Xiao**. Nanoscopic study of the grain boundaries of $Cu(InGa)Se_2$	*International CIGS Workshop IW-CIGS Tech 8*	2017	Yes	Yes	No
	1m	20 Jan 2018, CUHK, Hong Kong	**Xudong Xiao.** Bandgap design and bandgap engineering in Cu(InGa)Se2 thin films for photovoltaic application	*Workshop on quantum materials and quantum technology*	2018	Yes	Yes	No
ST2	2a	27 Nov - 2 Dec 2016, Boston, USA	Jie Cao, **Ni Zhao** & **Ching-Ping Wong**. Air-Stable Perovskite Solar Cells with Metal Oxides as Charge Transport Layers	*2016 MRS Fall Meeting & Exhibit*	2017	Yes	Yes	No
	2b	18 – 23 Jun 2017, Singapore	**Shih-Chi Chen**. Metal Micro-additive Manufacturing Based on Parallel Femtosecond Machining and Electrodeposition	*9th International Conference on Materials for Advanced Technologies 2017*	2018	Yes	Yes	No

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	2d	29 Oct – Nov 3, 2017, Charlotte, North Carolina, USA	Chenglin Li & **Shih-Chi Chen**. A flexure-based multi-layer roll-to-roll printing system (accepted)	*Annual Meeting of the American Society for Precision Engineering*	2017	Yes	Yes	No
	2e	27 - 28 May 2017, Beijing	**Jianbin Xu**. Chemistry understanding and functional engineering of perovskite solar cells based on sequential deposition method	*4th Conference of New Generation Solar Cell*	2017	Yes	Yes	No
	2f	29 Mar – 1 April, 2017, Xi'an, China	**Jianbin Xu**. Engineering of Chemical Coordination and Opto-Electronic Properties of High-Performance Perovskite Solar Cells	*China PV Technology International Conference (CPTIC)*	2017	Yes	Yes	No
	2g	25 - 29 Jan 2016, Okinawa, Japan	**Jian-Bin Xu**, **Ni Zhao**, Feng Wang, Hui Yu, Keyou Yan, Mingzhu Long & Tiankai Zhang. Recent progress in perovskite solar cells at The Chinese University of Hong Kong.	*The International Symposium on Functional Materials*	2016	Yes	Yes	No
	2h	10 – 15 Jun 2018, Hong Kong	**Keyou Yan.** Improving the efficiency and stability of perovskite solar cell via intermediate and interface engineering	*Gordon Research Conference: Hybrid Electronic and Photonic Materials and Phenomena. Electronic and Photonic Processes and Interfacial Phenomena in Organic/Inorganic Hybrid Materials and Their Applications in Optoelectronic Devices*	2018	Yes	Yes	No

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	2i	26 – 28 May 2017, Beijing, China	Mingzhu Long, **Keyou Yan**. -中间体卤素交换法制备大晶粒高效率 FAPbI3-xBrx 钙钛矿电池	第四届新型太阳能电池学术研讨会	2018	Yes	Yes	No
	2j	14 – 17 Aug 2017, USA	**Keyou Yan**. Coordination Engineering and Interface Engineering for High-Performance Perovskite Solar Cells	AFM 2017	2018	Yes	Yes	No
	2k	30 – 31 Mar 2018, Orlando Florida, USA	**Keyou Yan**. New-generation photovoltaic technology based on hybrid materials	*International Summit on Conventional and Sustainable Energies*	2018	Yes	Yes	No
	2l	2 – 6 Apr 2018, Phoenix Arizona, USA	**Keyou Yan, Jian-Bin Xu,** Jiangsheng Xie, Mingzhu Long & Shihe Yang. Stability study and coordination engineering in perovskite photovoltaics	*2018 MRS Spring Meeting & Exhibit*	2018	Yes	Yes	No
	2m	27 - 28 May 2017, Beijing	**Keyou Yan**, **Jianbin Xu** & Mingzhu Long. Nonstoichiometric precursor reaction for perovskite solar cell	*4th Conference of New Generation Solar Cell*	2017	Yes	Yes	No
	2n	18 – 23 Jun 2017, Singapore	Tiankai Zhang, **Jianbin Xu** & Mingzhu Long. Crystallinity preservation and ion migration suppression through dual ion exchange strategy for stable perovskite solar cells.	*9th International Conference on Materials for Advanced Technologies (ICMAT 2017)*	2018	Yes	Yes	No

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	2q	27 Nov – 2 Dec 2016, Boston, USA	Yang Zhou, Feng Wang, Hong-Hua Fang, Maria Antonietta Loi, Fang-Yan Xie, **Ni Zhao** & **Ching-Ping Wong.** Distribution of bromine in mixed iodide–bromide organolead perovskites and its impact on photovoltaic performance	*2016 MRS Fall Meeting & Exhibit*	2018	Yes	Yes	No
	2r	27 Nov - 02 Dec 2016, Boston, USA	**Ni Zhao,** Feng Wang, Hui Yu, Jie Cao, Yang Zhou. Material Engineering for Hybrid Perovskite Solar Cells	*2016 Material Research Society Fall Meeting*	2017	Yes	Yes	No
	2s	19 – 24 Jun 2016, Hong Kong	**Ni Zhao**. Phenylalkylamine Passivation of Organolead Halide Perovskites Enabling High-Efficiency and Air-Stable Photovoltaic Cells	*Gordon Research Conference 2016*	2016	Yes	Yes	No
	2t	25 Nov – 30 Nov 2018, Boston, USA	Shenghe Zhao, Jiangsheng Xie, Han Wang, **Jianbin Xu*, and Keyou Yan*.** General Nondestructive Post-Treatment to Passivate Perovskite Solar Cells with Enhanced Stability and Performance.	*2018 Material Research Society Fall Meeting*	2018	Yes	Yes	No
ST3	3a	10 – 13 July 2017, Liverpool, UK	Alice Wai Ming Chan, Zhuofeng Hu & **Jimmy C. Yu**. One-step incorporation of TiO2 nanoparticles to red phosphorus.	*13th International Conference on Materials Chemistry (MC13)*	2018	Yes	No	No

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	3b	11 - 13 June 2018, Barcelona, Spain	Alice Wai Ming Chan. Manganese Acetylacetonate as the precursor of high capacitance manganese oxides nanoparticles – the only active component in the supercapacitor electrode.	*19th World Congress on Materials Science and Engineering*	2018	Yes	No	No
	3c	3 – 9 July 2016, Nanjing	Xiao-Fei Chen & **Dennis K.P. Ng**. Push-Pull Phthalocyanine-Based Photosensitizers for Dye-Sensitized Solar Cells	*The 9th International Conference on Porphyrins and Phthalocyanines*	2017	Yes	Yes	Yes
	3d	9 – 13 July 2017, The Chinese University of Hong Kong, China	Xiao-Fei Chen, Wen-Jing Shi, Takumi Kinoshita & **Dennis K.P. Ng**. Push-Pull Boron Dipyrromethene-Based Photosensitizers for Dye-Sensitized Solar Cells	*IMEBORON XVI*	2017	Yes	Yes	No
	3e	4 – 9 Dec 2016, Auckland	Xiao-Fei Chen & **Dennis K.P. Ng**. Artificial Photosynthetic Models Based on Assemblies of BODIPY/Porphyrin, Phthalocyanine, and C_{60} Moieties	*The 8th Asian Biological Inorganic Chemistry Conference*	2017	Yes	Yes	No
	3f	1-6 July 2018, Munich	Xiaofei Chen & **Dennis K. P. Ng**. Water-soluble β-cyclodextrin-conjugated phthalocyanines as building blocks for photosynthetic models and photosensitizers for photooxygenation reactions.	*10th International Conference on Porphyrins & Phthalocyanines*	2018	Yes	Yes	No

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	3g	4 – 9 Dec 2016, Auckland	Xiao-Fei Chen, Wen-Jing Shi, Eugency A. Ermilov, Kei Ohkubo, Shunichi Fukuzumi & **Dennis K.P. Ng**. Assemblies of Functional Dyes as Artificial Photosynthetic Models	*The 8th Asian Biological Inorganic Chemistry Conference*	2017	Yes	Yes	No
	3h	20 - 24 Aug 2016, Jinan, China	Zhuofeng Hu, Zhurui Shen & **Jimmy C. Yu**. Covalent Fixation of Surface Oxygen Atoms on Hematite Photoanode for Enhanced Water Oxidation.	*The 15th National Conference on Solar Energy Photochemistry & Photocatalysis*,	2018	Yes	Yes	Yes
	3i	10 – 13 July 2017, Liverpool, UK	Yang Liu, Donald K. L. Chan, Zhuofeng Hu* & **Jimmy C. Yu***. Hittorf's phosphorus microbelt photocatalyst grown on a liquid bismuth surface	*13th International Conference on Materials Chemistry (MC13)*	2018	Yes	No	No
	3j	3 – 5 Aug 2015, Singapore.	**Jianfang Wang**. Colloidal metal nanocrystals for nanoplasmonics.	*5th Molecular Materials Meeting (M3): The Next 50 Years of Materials Research*	2016	Yes	Yes	No
	3k	10 – 17 Aug 2015, Cancun, Mexico.	**Jianfang Wang**. Colloidal metal nanocrystals for plasmonic catalysis	*NANOMXCN, Mexico-China Workshop on Nano: Materials/Science/Technology*	2016	Yes	Yes	No
	3l	15 – 20 Dec 2015, Honolulu, Hawaii, USA	**Jianfang Wang**. Colloidal plasmonic metal nanocrystals	*The International Chemical Conference of Pacific Basin Societies 2015*	2016	Yes	Yes	No

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	3m	22 – 25 Mar 2016, Academia Sinica, Taiwan	**Jianfang Wang**. Plasmonic metal nanocrystals.	*The 12th Cross-Strait Workshop on Nanoscience and Nanotechnology, Institute of Physics*	2016	Yes	Yes	No
	3n	25 – 30 June 2017, The Chinese University of Hong Kong, Hong Kong, China	**Jianfang Wang**. Plasmonic Driving of Liquid-Phase Chemical Reactions with Colloidal Plasmonic Nanostructures	*Gordon Research Conference - Plasmonically-Powered Processes: Plasmon Energy Transfer*	2017	Yes	Yes	No
	3o	10 – 12 Nov 2016, Beijing, China	**Jianfang Wang**. Plasmonic Enhancement of Chemical Reactions	*International Conference on Advancing the Chemical Sciences (ISACS)*	2017	Yes	Yes	No
	3p	4 – 8 Dec 2016, Singapore	**Jianfang Wang**. Keynote Presentation: Plasmonic Enhancement of Chemical Reactions	*9th Asian Photochemistry Conference (APC) 2016*	2017	Yes	Yes	No
	3q	1 – 5 Oct 2017, National Harbor, MD (greater Washington, DC area)	**Jianfang Wang**. Plasmonic Driving of Chemical Reactions	*232nd ECS (The Electrochemical Society) Meeting*	2017	Yes	Yes	No

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	3r	15 – 20 Dec 2015, Hawaii, USA	Wanjun Wang & **Jimmy C. Yu**. Room temperature sonochemical synthesis of red phosphorus/g-C3N4 hybrid nanosheets for photocatalytic hydrogen evolution.	*Pacifichem 2015*	2016	Yes	Yes	No
	3s	21 – 25 Aug 2015, Xiamen, China	**Jimmy C. Yu**. Recent Development and commercialization of advanced photocatalytic technologies.	*The 2nd Cross-Strait Conference on Functional Materials Technology and Industry.*	2016	Yes	Yes	No
	3t	1 - 2 June 2017, Hong Kong	**Jimmy C. Yu.** Photocatalytic Technology: from Lab to Market.	*Applied Environmental Nanotechnology Workshop*.	2018	Yes	No	No
	3u	22 – 24 Feb 2017, Baltimore, USA	**Jimmy C. Yu** & Donald K.L. Chan.. Facile Synthesis of Carbon- and Oxygen-rich Graphitic Carbon Nitride with Enhanced Visible-light Photocatalytic Activity.	*International Conference on Catalysis and Chemical Engineering*	2018	Yes	No	No
	3v	18 – 21 Feb 2018, Paris	**Jimmy C. Yu**. The development of phosphorus and carbon-based photocatalysts	*2nd International Conference on Catalysis and Chemical Engineering*	2018	Yes	No	No
	3w	3 – 6 Jan 2016, Singapore	Wenhua Zhang & **Dongyan Xu**. An integrated cross-plane thermoelectric generator fabricated by the pulsed electroplating and microfabrication methods	*The ASME 2016 5th International Conference on Micro/Nanoscale Heat and Mass Transfer*	2016	Yes	Yes	Yes

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ST4	4b	27 May 2015, Chicago, USA	Hongning Chen, Qingli Zou, Zhuojian Liang, Hao Liu, Quan Li & **Yi-Chun Lu**. A sulfur-impregnated flow cathode for high-energy lithium flow batteries.	*227th Electrochemical Society (ECS) Meeting Chicago*	2016	Yes	Yes	Yes
	4c	16 Aug 2016, Cancun, Mexico	**Yi-Chun Lu**. Redox processes and design strategies for high-energy-density energy storage devices	*25th International Materials Research Congress*	2017	Yes	Yes	No
	4d	13 Dec 2016, Singapore	**Yi-Chun Lu**. High-Energy-Density Energy Storage: Redox Activities and Design Strategies	*9th Singapore International Chemistry Conference (SICC 9)*	2017	Yes	Yes	No
	4e	16 Feb 2017, San Francisco, USA	**Yi-Chun Lu**. High-Energy-Density Multiple Redox Semi-Solid-Liquid Flow Battery: Redox Processes and Design Strategies.	*7th Next-Generation Energy Storage*	2017	Yes	Yes	No
	4g	1 – 5 Oct 2017, Maryland USA	Guo-Ming Weng, Zhejun Li, Guangtao Cong, Yucun Zhou & **Yi-Chun Lu**. Unlocking the capacity of iodide for high-energy-density polyiodide-based redox batteries	*232nd Electrochemical Society (ECS) Meeting*	2018	Yes	Yes	No
	4h	27 – 29 Jun 2016, Singapore	**Ching-ping Wong.** Graphene as renewable, sustainable green solar energy storage applications.	*2016 International Conference on Material Engineering on Smart Materials (ICMESM)*	2018	Yes	No	No

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	4i	16 – 19 Aug 2016, Wuhan, China	**Ching-ping Wong.** Hybrid Nano Battery-supercapacitor Materials for Renewable Energy Storage Applications	*17th International Conference on Electronic Packaging Technology (ICEPT 2016)*	2017	Yes	Yes	No
	4j	4 – 8 June 2017, Los Angeles, CA, USA	**Ching-Ping Wong*** Rational Synthesis of Nanostructured Electrode Materials for High-performance Supercapacitors.	Proceedings of the *ASME 2017 12th International Manufacturing Science and Engineering Conference (MSEC2017*)	2018	Yes	Yes	No
ST5	5a	18 – 21 Feb 2018, San Diego, USA	Jiongyi Chen, Wenrui Diao, Qiangchuan Zhao, Chaoshun Zu, Zhiqiang Lin, XiaoFeng Wang, Wing Cheong Lau, Menghan Sun, Ronghai Yang & **Kehuan Zhang**. IoTFuzzer: Discovering Memory Corruptions in IoT through app-based fuzzing	*25th Annual NDSS Symposium*	2018	Yes	Yes	Yes
	5b	21 – 24 Jun 2016, Waterloo, Canada	Lei Deng, Mohammad Hajiesmaili, **Minghua Chen** & Haibo Zeng. Energy-efficient timely transportation of long-haul heavy-duty trucks	*Proceedings of the Seventh International Conference on Future Energy Systems (ACM e-Energy 2016)*	2016	Yes	Yes	Yes
	5c	21 – 24 Jun 2016, Waterloo, Canada	Mohammad Hajiesmaili, Chi-Kin Chau, **Minghua Chen** & Longbu Huang. Online microgrid energy generation scheduling revisited: The benefits of randomization and interval prediction.	*Proceedings of the seventh International Conference on Future Energy Systems (ACM e-Energy 2016)*	2016	Yes	Yes	Yes

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	5d	16 – 19 May 2017, Hong Kong	Mohammad Hajiesmaili, **Minghua Chen**, Enrique Mallada & Chi-Kin Chau. Crowd-sourced storage-assisted demand response in microgrids.	*Proceedings of the Eighth International Conference on Future Energy Systems (ACM e-Energy 2017)*	2017	Yes	Yes	Yes
	5e	12 – 15 June 2018, Karlsruhe, Germany	Qingyu Liu, Haibo Zeng & **Minghua Chen**. Energy-efficient timely truck transportation for geographically-dispersed tasks.	*Ninth International Conference on Future Energy Systems (ACM e-Energy 2018)*	2018	Yes	Yes	No
	5f	3 – 6 Jan 2018, Big Island, HI, USA.	John Z.F. Peng, Pengcheng You & **Minghua Chen**. Temporally networked cournot platform markets.	*51st Hawaii International Conference on System Sciences*	2018	Yes	No	No
	5g	2 – 5 Nov 2015, Miami, USA	Wanrong Tang & **Ying Jun (Angela) Zhang**. Optimal battery energy storage system control in microgrid with renewable energy generation. DOI: 10.1109/SmartGridComm.2015.7436407	*2015 IEEE International Conference on Smart Grid Communications (SmartGridComm): Data Management, Grid Analytics, and Dynamic Pricing*	2016	Yes	Yes	Yes
	5h	3-6 November 2014, Venice, Italy	Hao Wang & **Jianwei Huang**, Hybrid renewable energy investment in microgrid.	*2014 IEEE International Conference on Smart Grid Communications (SmartGridComm)*	2014	Yes	Yes	Yes

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	5i	8-12 June 2015, London, UK	Hao Wang & **Jianwei Huang***, Bargaining-based energy trading market for interconnected microgrids	*2015 IEEE International Communications Conference (ICC)*	2015	Yes	Yes	Yes
	5j	June 2018, Kansas City, USA.	Shuoyao Wang, Suzhi Bi & **Ying Jun Zhang**. The impact of energy customers demand response on real-time electricity market participants.	*IEEE International Conference on Communications (ICC)*	2018	Yes	Yes	No
	5k	5 – 9 June 2017, Urbana-Champaign, USA	Lin Yang, Mohammad. Hajiesmaili, Hanling Yi & **Minghua Chen**. Hour-ahead offering strategies in electricity market for power producers with storage and intermittent supply.	*ACM SIGMETRICS (poster paper)*	2017	Yes	Yes	Yes
	5l	5 – 9 June 2017, Urbana-Champaign, USA	Lin Yang, Mohammad H. Hajiesmaili, Hanling Yi & **Minghua Chen**. Online offering strategies for storage-assisted renewable power producer in hour-ahead market	*ACM SIGMETRICS*	2017	Yes	No	Yes
	5m	12 – 15 Dec 2017, Melbourne, Australia.	Pengcheng You, John Z.F. Pang, Minghua Chen, Steven H. Low & Youxian Sun. Battery swapping assignment for electric vehicles: A bipartite matching approach.	*56th IEEE Conference on Decision and Control (CDC)*	2018	Yes	No	No

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	5n	3-6 November 2014, Venice, Italy	Wei Yuan, **Jianwei Huang** & **Ying Jun (Angela) Zhang**, Competitive charging station pricing for plug-in electric vehicles	*2014 IEEE International Conference on Smart Grid Communications (SmartGridComm)*	2014	Yes	Yes	Yes
	5o	14 -17 Jul 2015, Bangalore, India	Lei Zhan & **Dahming Chiu**. Encouraging energy conservation in campus dormitory via monitoring and policies.	*International Workshop on Distributed Energy Networks (DEN), co-located with ACM e-Energy*	2016	Yes	Yes	Yes
	5p	16 – 17 Nov 2016, Stanford	Lei Zhan & **Dah Ming Chiu**. Delivering Group-based feedback of electricity usage in campus dorms	*ACM BuildSys 2016, Poster*	2017	Yes	Yes	No
	5q	Feb 2017, San Francisco	Lei Zhan & **Dah Ming Chiu**. Data analytic policy design applied to energy conservation in college dormitories	*International Workshop on Artificial Intelligence for Smart Grid and Smart Buildings, AAAI 2017*	2017	Yes	Yes	No
	5r	17-21 July 2016, Boston, MA, USA	Chaorui Zhang & **Ying Jun (Angela) Zhang**. Optimal distributed generation placement among interconnected cooperative microgrids. DOI: 10.1109/PESGM.2016.7741179	*Power and Energy Society General Meeting (PESGM), 2016*	2017	Yes	Yes	Yes

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	5s	6-9 Nov. 2016, Sydney, NSW, Australia	Chaorui Zhang & **Ying Jun (Angela) Zhang**. Optimal solar panel placement in microgrids. DOI: 10.1109/SmartGridComm.2016.7778790	*IEEE International Conference on Smart Grid Communications (SmartGridComm), 2016*	2017	Yes	Yes	No
	5t	1 – 4 May 2017, Atlanta, US	Ying Zhang, Lei Deng, **Minghua Chen** & Peijian Wang. Joint bidding and geographical load balancing for datacenters: Is uncertainty a blessing or a curse?	*IEEE INFOCOM*	2017	Yes	No	Yes
	5u	21 – 25 May, 2017, Paris, France	Dongwei Zhao, Hao Wang, **Jianwei Huang** & Xiaojun Lin, Pricing-based energy storage sharing and virtual capacity allocation.	*IEEE International Conference on Communications (ICC)*	2017	Yes	Yes	Yes
	5v	10 -15 Apr 2016, San Francisco, CA	Shizhen Zhao, Xiaojun Lin, Dionysios Aliprantis, Hugo N. Villegas & **Minghua Chen**. Online multi-stage decisions for robust power-grid operations under high renewable uncertainty.	*IEEE INFOCOM 2016*	2016	Yes	Yes	Yes
	5w	15 – 19 Apr 2018, Honolulu, USA	Yihan Zou, Xiaojun Lin & **Minghua Chen**. Robust multi-stage power grid operations with energy storage.	*IEEE International Conference on Computer Communications*	2018	Yes	Yes	No

ST	No.	Month/Year/ Place	Title	Conference Name	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknowledged the support of the RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
	5x	May 2019, Shanghai, China	Dongwei Zhao, Hao Wang, Jianwei Huang, Xiaojun Lin. Controllable vs. Random: Renewable Generation Competition in a Local Energy Market	*IEEE International Conference on Communications (ICC)*	2019	Yes	Yes	Yes
	5y	20-24 May 2018, Kansas, US	Shuoyao Wang, Suzhi Bi and Ying-Jun (Angela) Zhang. The Impacts of Energy Customers Demand Response on Real-time Electricity Market Participants.	*IEEE International Conference on Communications (ICC)*	2018	Yes	Yes	Yes
ST6	6a	25 – 27 Oct 2017, Beijing, China	Yufei He, **Zhao Xu** & Yujun Li. A Novel Control Scheme for Enhancing Low Voltage Ride Through Capability of Solar Generation	*Proceedings of 2017 China International Electrical and Energy Conference (CIEEC 2017), 129-134*	2018	Yes	Yes	No
	6b	26 - 30 Jul 2015, Denver, CO.	Yujun Li, **Zhao Xu**, Kit Po Wong & Loi Lei Lai. A two-stage power dispatching algorithm for system support by droop-controlled DC grids. DOI: 10.1109/PESGM.2015.7286172	*Power & Energy Society General Meeting*	2016	Yes	Yes	No

ST	No.	Month/Year/ Place	Title	Conference Name	Submitted to the RGC *(indicate the year ending of the relevant progress report)*	Attached to this report *(Yes or No)*	Acknowledged the support of the RGC *(Yes or No)*	Accessible from the institutional repository *(Yes or No)*
	6c	17 – 21 July 2016, Boston	Jian Zhao, Can Wan & **Zhao Xu**. Impacts of large-scale photovoltaic generation penetration on power system spinning reserve allocation. (One of the Best Conference Papers submitted to the 2016 Power & Energy Society General Meeting)	*IEEE Power and Energy Society General Meeting (PES), 2016*	2017	Yes	Yes	No
	6d	17 - 21 July 2016, Boston	Songjian Chai, Ming Niu, **Zhao Xu**, Loi Lei Lai & Kit Po Wong, Nonparametric Conditional Interval Forecasts for PV Power Generation Considering the Temporal Dependence.	*IEEE Power and Energy Society General Meeting (PES)*	2017	Yes	Yes	No
	6e	18 - 21 July 2016, Futuroscope-Poitiers, France	Shunqi Zeng, **Zhao Xu**, Fushuan Wen & Loi Lei Lai. Chance Constrained Programming Based Optimal Network Reconfiguration in Smart Grid.	*2016 IEEE International Conference on Industrial Informatics (INDIN 2016)*	2017	Yes	Yes	No

Appendix 3

Research Students Trained (registration/award) (Section 6.6 of Main Report)

ST	Name of students	Degree registered for	Date of registration	Dates of thesis submission/ graduation	Supervisor
ST1	LIU Bin	PhD	1 Aug 2015	31 Jul 2018	Xudong Xiao
	XU Chaoqiang	PhD	1 Aug 2012	10 Oct 2017	Xudong Xiao
	YE Zi	PhD	1 Aug 2013	31 Jul 2018	Xudong Xiao
	YIN Ling	PhD	1 Aug 2010	20 Aug 2015	Xudong Xiao
	ZHI Zong	PhD	1 Aug 2014	31 Jul 2018	Xudong Xiao
	KONG Yifan	PhD	1 Aug 2016	31 Jul 2020	Xudong Xiao
	HUANG Lan	PhD	1 Aug 2016	31 Jul 2020	Xudong Xiao
	MA Yaping	PhD	1 Aug 2012	30 Sept 2017	Xudong Xiao & Xinhui LU
	MAI Jiangquan	PhD	1 Aug 2012	31 Dec 2016	
	XIONG Zhiyu	PhD	1 Aug 2015	31 Jul 2018	
	LAU Tsz Ki	PhD	1 Nov 2013	31 Oct 2017	Xinhui Lu
	HU Liangbin	PhD	1 Sept 2011	31 Jul 2015	Quan Li
	XIAO Yiqun	PhD	1 Sep 2014	31 Aug 2018	Jiannong Wang
ST2	LONG Mingzhu	PhD	1 Aug 2013	10 Feb 2017	Jianbin Xu/Keyou YAN
	XIAO Yubin	PhD	1 Aug 2011	31 Jun 2015	Jianbin Xu
	YE Lei	PhD	1 Aug 2011	31 Jul 2014	Jianbin Xu
	ZHANG Tiankai	PhD	1 Aug 2014	31 Jul 2018	Jianbin Xu
	ZHAO Shenhe	PhD	1 Mar 2016	31 Jul 2020	Jianbin Xu/Keyou YAN
	WANG Han	PhD	1 Aug 2016	31 Jul 2020	Jianbin Xu/Keyou YAN
	WANG Dien	PhD	1 Sep 2014	31 Jul 2018	Shih-Chi Chen
	WANG Ji	PhD	1 Aug 2014	31 Jul 2018	Shih-Chi Chen
	ZHOU Xi	PhD	1 Sep 2011	31 Mar 2016	Shih-Chi Chen
	LI Chenglin	PhD	1 Aug 2013	31 Dec 2017	Shih-Chi Chen
	CHEN Wang	PhD	1 Aug 2016	31 Dec 2019	Shih-Chi Chen
	CHANG Shuai	PhD	1 Sep 2011	31 Jul 2015	Tao Chen
	HE Jian	PhD	1 Sep 2012	31 Jul 2016	Tao Chen
	WANG Baohua	PhD	1 Sep 2012	31 Jul 2016	Tao Chen
	ZHAO Jingbo	PhD	15 Aug 2013	30 Nov 2015	Henry Yan
	LIN Haoran	PhD	15 Aug 2013	30 Nov 2016	Henry Yan
	LU Haipeng	M Phil	1 Aug 2014	31 Oct 2016	Ni Zhao
	WU Xiaojing	PhD	1 Aug 2012	30 June 2017	Ni Zhao
	YU Hui	PhD	1 Sep 2012	30 Sep 2015	Ni Zhao
	CAO Jie	PhD	1 Sep 2014	31 Jul 2018	CP Wong/Ni Zhao
	ZHOU Yang	PhD	1 Aug 2014	31 July 2018	CP Wong/Ni Zhao
ST3	CHAN Donald	PhD	1 Aug 2012	31 July 2016	Jimmy Yu
	CHAN Wai Ming Alice	PhD	1 Aug 2016	31 July 2020	Jimmy Yu
	GU Ting	PhD	1 Aug 2011	31 July 2015	Jimmy Yu
	JIN Zexun	PhD	1 Aug 2012	31 July 2016	Jimmy Yu
	LI Yecheng	PhD	1 Aug 2010	31 July 2015	Jimmy Yu

ST	Name of students	Degree registered for	Date of registration	Dates of thesis submission/ graduation	Supervisor
	LIU Yang	PhD	1 Aug 2016	31 July 2020	Jimmy Yu
	HAN Shuanghua	PhD	1 Aug 2014	31 July 2018	Dennis Ng
	CHEN Xiaofei	PhD	1 Aug 2013	Sep 2016	Dennis Ng
	JIA Henglei	PhD	1 Aug 2013	31 July 2016	Jianfang Wang
	YANG Jianhua	PhD	1 Aug 2015	31 July 2018	Jianfang Wang
	LIU Yi	PhD	1 Aug 2014	31 Dec 2018	Dongyan Xu
	FU Qiang	PhD	1 Aug 2011	31 Dec 2015	Dongyan Xu
	ZHANG Wenhua	PhD	1 Aug 2013	31 July 2017	Dongyan Xu
	WAN Yan-Jun	PhD	1 Aug 2014	31 July 2018	Wei-Hsin Liao
ST4	SHEN Suling	PhD	1 Aug 2013	31 July 2017	CP Wong
	XU Junling	PhD	1 Sep 2013	31 July 2018	CP Wong/Ni Zhao
	XU Mengjie	M Phil	1 Aug 2016	31 July 2018	CP Wong
	ZHOU Shuang	PhD	1 Sep 2011	30 Sep 2015	CP Wong
	CHEN Hongning	PhD	1 Aug 2013	30 Jul 2016	Yi-Chun Lu
	WANG Zengyue	M Phil	1 Aug 2015	31 July 2017	Yi-Chun Lu
	LI Zhejun	PhD	1 Aug 2014	30 Jul 2018	Yi-Chun Lu
	ZOU Qingli	PhD	1 Aug 2014	30 Jul 2018	Yi-Chun Lu
ST5	ZHAN Lei	PhD	1 Aug 2011	15 Aug 2017	Dahming Chiu
	DENG Lei	PhD	1 Aug 2013	31 July 2017	Minghua Chen
	LIN Qiu Lin	PhD	1 Aug 2016	31 July 2020	Minghua Chen
	YI Hanling	PhD	1 Aug 2014	31 July 2018	Minghua Chen
	ZHANG Ying	PhD	1 Aug 2013	31 July 2017	Minghua Chen
	ZHAO Tianyu	PhD	1 Aug 2017	31 July 2021	Minghua Chen
	WANG Hao	PhD	1 Aug 2011	31 July 2016	Jianwei Huang
	ZHAO Dongwei	PhD	1 Aug 2015	31 July 2019	Jianwei Huang
	TANG Wanrong	PhD	1 Aug 2011	31 July 2015	Angela Zhang
	ZHANG Chaorui	PhD	1 Aug 2012	Late 2017	Angela Zhang
	CHEN Jiongyi	PhD	1 Aug 2015	31 July 2019	Kehuan Zhang
ST6	NIU Ming	PhD	7 July 2014	6 July 2017	Zhao Xu
	LI Yujun	PhD	4 Aug 2014	25 May 2017	Zhao Xu
	CHAI Songjian	PhD	21 Jul 2015	20 Jul 2018	Zhao Xu
	LYU Xue	PhD	16 Jul 2016	15 Jul 2019	Zhao Xu
	HE Yi	MPhil	22 Aug 2016	21 Aug 2018	Zhao Xu
	HE Yufei	MPhil	29 Aug 2016	28 Aug 2018	Zhao Xu
	KONG Weicong	PhD	2 Mar 2014	20 Jun 2017	Zhao Yang Dong
	LIU Long	PhD	27 Feb 2014	20 Jun 2017	Zhao Yang Dong
	WANG Yijia	PhD	2 Jul 2014	20 Dec 2017	Zhao Yang Dong
	ZHAI Qiwei	PhD	10 Mar 2014	20 Dec 2017	Zhao Yang Dong