



Department: School of Materials Science and Engineering

Professional field: Materials Science & Engineering

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## Profile

2020 East China University of Science and Technology, Professor

2019 Shandong University, Professor

2018 University of Nebraska – Lincoln, Postdoctoral Research Fellow

2017 Nanyang Technological University, Postdoctoral Research Fellow

2016 East China University of Science and Technology, Ph.D.

2011 Qingdao University of Science and Technology, B.E.

## Research Field

Our research focus on the opto-electrical material and devices. We hope to elucidate the fundamental processing-structure-property relationships of novel materials and devices on the atomic and molecular scale.

1. Design and synthesis of semiconducting crystals.
2. Next-generation Solar Cells. Our current solar cell project consists of perovskite based and organic-inorganic hybrid solar devices.
3. Optoelectronic Information Devices. We are interested in devices with the capacity of signal detection, transmission and storage.

## Research results and selected published papers

1. Jingjing He, Junxian Liu, Yu Hou\*, Yun Wang\*, Shuang Yang\*, Hua Gui Yang, Surface chelation of cesium halide perovskite by dithiocarbamate for efficient and stable solar cells, Nature Communications, 2020, 11, 4237. (reported by Nanowerk: “Chelation - a new bonding mode for stable perovskite surface”)
2. Ze Qing Lin, Hong Wei Qiao, Zi Ren Zhou, Yu Hou, Xiaolong Li, Hua Gui Yang\*, Shuang Yang\*, Water assisted growth of oriented, large grain-sized CsPbI<sub>2</sub>Br perovskite films with solar cell efficiency exceeding 16%, Journal of Materials Chemistry A, 2020, 8, 17670-17674.
2. Shuang Yang#, Shangshang Chen#, Edoardo Mosconi, Yanjun Fang, Xun Xiao, Congcong Wang, Yu Zhou, Zhenhua Yu, Jingjing Zhao, Yongli Gao, Filippo De Angelis, Jinsong Huang\*, Stabilizing halide perovskite surfaces for solar cell operation with wide-bandgap lead oxysalts, Science, 2019, 6452 (365), 473-478. (ESI highly cited paper, ESI hot paper, highlighted by Physics Word: “Can surface treatments enable commercial perovskite solar cells?”)
3. Shuang Yang, Jun Dai, Zhenhua Yu, Yuchuan Shao, Yu Zhou, Xun Xiao, Xiao Cheng Zeng, and Jinsong Huang\*, Tailoring passivation molecular structures for extremely small open-circuit voltage loss in perovskite solar cells, Journal of the American Chemical Society, 2019, 141 (14), 5781–5787. (ESI highly cited paper, ESI hot paper)
4. Shuang Yang#, Zeyuan Xu#, Sha Xue, Praneeth Kandlakunta, Lei Cao\* and Jinsong Huang\*, Organohalide lead perovskites: more stable than glass under gamma-ray radiation, Advanced Materials, 2019, 31, 1805547.
5. Hong Wei Qiao#, Shuang Yang#, Yun Wang#, Xiao Chen, Tian Yu Wen, Li Juan Tang, Qilin Cheng, Yu Hou\*, Huijun Zhao\*, Hua Gui Yang\*, A gradient heterostructure based on tolerance factor in high-performance perovskite solar cells with 0.84 fill factor, Advanced Materials, 2019, 1, 1804217. (ESI highly cited paper)
6. Shuang Yang, Wenxin Niu, An-Liang Wang, Zhanxi Fan, Bo Chen, Chaoliang Tan, Qipeng Lu and Hua Zhang\*, Ultrathin organic-inorganic perovskite nanosheets with bright, tunable photoluminescence and high stability, Angewandte Chemie International Edition, 2017, 56 (15), 4252-4255. (ESI highly cited paper, VIP paper, reported by Advance Science News: “Solvent is the key to making perovskite nanosheets”)
7. Shuang Yang#, Yun Wang#, Porun Liu, Yi Bing Cheng, Hui Jun Zhao\*, Hua Gui Yang\*, Functionalization of perovskite thin films with moisture-tolerant molecules, Nature Energy, 2016, 1, 15016. (cover, ESI hot paper, ESI highly cited paper, highlighted by Chemistry Word: “Dip coating to solve perovskite moisture sensitivity”)
8. Shuang Yang#, Bing Xing Yang#, Long Wu#, Yu Hang Li, Porun Liu, Huijun Zhao, Yan Yan Yu, Xue Qing Gong\*, Hua Gui Yang\*, Titania single crystals with a curved surface, Nature Communications, 2014, 5, 5355.
10. Shuang Yang, Yi Chu Zheng, Yu Hou, Xiao Chen, Ying Chen, Yun Wang, Huijun Zhao and Hua Gui Yang\*, Formation mechanism of freestanding CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> functional crystals: in situ transformation vs dissolution-crystallization, Chemistry of Materials, 2014, 26 (23), 6705-6710.