

Impact of Growth Techniques on Organometallic Halide Perovskite Based Solar Cells

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Abstract

Organometallic halide perovskite based solar cells (PSCs) have been attracted increasing attentions in the field of photovoltaics due to their impressive device performance with low manufacturing costs, which make them highly competitive with the existing solar technologies such as dominant silicon solar cells in the near future. To ensure the high power conversion efficiency (PCE) and good stability of the devices, the material quality of the perovskite absorber is one of the crucial factors. The continuous development and optimization of thin film growth techniques for different types of perovskite materials accelerate the progress of large-scale productions for future commercialization. In this talk, the impacts of different perovskite growth techniques including solution process, thermal evaporation and hybrid chemical vapor deposition (HCVD) on the perovskite film quality and the device performance will be discussed. A novel deposition technique, which is effective to yield high quality mixed halide perovskite films will be also introduced. Our proposed deposition method can replace the commonly used anti-solvent dripping technique for preparing mixed halide perovskite. This new approach increases the batch-to-batch reproducibility of PSCs and opens up the opportunities for future large-scale manufacturing. The champion device with a PCE of 21.4 % can be achieved based on our novel deposition technique.



Biography: Dr. Annie Ng received her B.S. in Applied Physics from the City University of Hong Kong in 2009 and Ph.D. from the University of Hong Kong in 2014. She obtained the Postdoctoral Fellowship from the Hong Kong Polytechnic University for her postdoctoral research works. She was also appointed as a visiting lecturer in the Department of Electronic and Information Engineering, the Hong Kong Polytechnic University in 2014. She is the member of IEEE Electron Devices Society and OSA. She is currently an assistant professor in Department of Electrical and Computer Engineering in Nazarbayev University. She has been working on advanced materials for new generation solar cells such as organic solar cells, dye-sensitized solar cells and organometal halide perovskite solar cells. She is interested in optoelectronics, nanomaterials, light-harvesting materials and device applications.