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Improved Electron Transport in $MAPbI_3$ Perovskite Solar Cells Based on Dual Doping Graphdiyne

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The properties of electron transport layers play a crucial role in determining the performance of perovskite solar cells. Here we reported the effect of graphdiyne doped into both PCBM and ZnO films of perovskite solar cells with an inverted structure based on $MAPbI_3$ for the first time. A high efficiency of 20.0% was achieved in $MAPbI_3$ perovskite solar cells with the *J-V* hysteresis and stability significantly improved as well. It reveals that the employment of dual-doping of graphdiyne not only brought out an increase of electrical conductivity, electron mobility, and charge extraction ability in the electron transport layers, but improved film morphology of the electron transport layers and reduced charge recombination which contribute to fill factor enhancement. This study indicates that dual doping graphdiyne is a promising strategy to optimize the performance of perovskite solar cells.

Biography:

Tonggang Jiu, Professor, currently serves as the group leader of the Carbon Based Photovaltaic Research Team, Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences (CAS). He received his Ph.D. degree from the Institute of Chemistry, CAS in 2006. From 2007 to 2012, he continued his research at CEA-Grenoble, Eindhoven University of Technology and University of Alberta where he was mainly engaged in nanomaterials based solar cells. In recent years, he has focused on Graphdiyne based photovaltaic devices, and published more than 40 papers in SCI journals. In 2012, Prof. Jiu was honored as a member of Youth Innovation Promotion Association, CAS.