Materials and Devices Engineering for Low Voltage Deficit in Perovskite Solar Cells

Jun Hong Noh(junhnoh@korea.ac.kr)
School of Civil, Environmental and Architectural Engineering, Korea University, Seoul 02841, Republic of Korea

Abstract

The perovskite solar cells (PSCs) show great potential for future photovoltaic technology due to the high performance via low-temperature fabrication. The PSCs have shown impressive progress in power conversion efficiency (PCE) exceeding 24 % in the last several years. This progress is attributed to developments of device architecture, perovskite halides, and fabrication process based on materials and devices engineering. However, there still remain many challenging issues on the PSCs to be commercialized in the various applications. For example, a breakthrough in materials and devices engineering is required for further improvement of PCE and long-term stability as well as the development of the scalable process. Among them, we have focused on minimizing open-circuit voltage deficit that is a difference between band-gap of the light absorbing halide and open-circuit voltage of the completed device. The voltage deficit is the result of a complex combination of factors including trap concentration, interfacial imperfection, energy band position arrangement, intrinsic electrical conduction, and even morphology of layers in perovskite solar cells. In this talk, our approaches will be introduced to minimize voltage deficit in PSCs in terms of halide materials and devices engineering.

Keywords: *perovskite, halide, solar cells, voltage deficit, junction*

Biography

Jun Hong Noh is an associate professor in the Division of Climate and Energy in the School of Civil, Environmental & Architectural Engineering, Korea University (KU), Korea. He joined in 2017 into KU and created the Advanced Energy Conversion Materials & Devices Laboratory. His research interests mainly focus on halide and oxide semiconductors for efficient and stable halide perovskite solar cells.