Hyung Wook Choi et al., Res. Rev. J Mat. Sci. 2017, 5:7
DOI: 10.4172/2321-6212-C1-012

Characterization and analysis of phosphor condition with electrode of perovskite solar cells

Hyung Wook Choi and **Jeong Hun Ma**
Gachon University, Republic of Korea

Nowadays, solar cells of silicon have reached efficiencies of up to 25% for single crystal Si. But, the production of such material requires energetically demanding processes and relatively expensive production. Recently, a new class of perovskite was introduced as light harvesting material, showing strong absorption in a broad region of the visible spectrum, good electron and hole conductivity, delivering also high open circuit voltages in photovoltaic devices. The main advantage of such an organic-inorganic hybrid material is a high absorption coefficient, excellent long distance carriers to move the hole diffusion length. Mixed halide perovskite materials, which electron hole diffusion length is ten times longer than those only containing iodide. Which presents efficient charge transport, low recombination rates and also good pore filling of the TiO_2 layer enhancing device performance with respect to Spiro-OMeTAD (HTM). Trivalent rare-earth (RE) ions activated materials have kept booming in the past decades owing to their wonderful applications in phosphor-converted white light-emitting diodes (WLEDs), solar cells, temperature sensors, and drug deliveries. RE ion-doped inorganic phosphors revealed intense luminescent properties and showed potential applications in WLEDs. The conversion luminescence of a phosphor from the ultraviolet region to the visible region can enhance the light harvesting in Perovskite solar cells (PSCs), because many perovskites can only absorb visible light. In this work, to explore the influence of phosphor additives on the conversion efficiency of PSC, we introduce the YAG:Ce^{3+} phosphor layer. The samples were characterized by XRD, SEM, UV–vis, PL and IV-curves. Photoelectrode DSSC with light-to-electric energy conversion efficiency was achieved under a simulated solar light irradiation of 100 mW/cm^2 (AM 1.5).

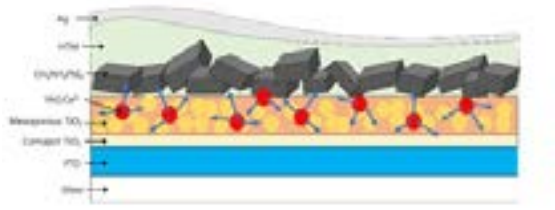

Fig. 1 Schematic illustration of the perovskite phosphor

Biography

Hyung Wook Choi has completed his PhD from Yonsei University, Korea and postdoctoral studies from Pennsylvania State University, USA. He has published more than 100 papers in SCI journals.

chw@gachon.ac.kr

Notes: