

Temperature or Light Stress Induced Degradation of Perovskite Materials

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The rapid development of metal halide perovskite solar cells (PSCs) makes such solar cells power conversion efficiency (PCE) comparable with silicon solar cells and the certified PCE has already reached 23.7%¹. However, long-term device stability is one of the most critical issues in PSCs. To improve the stability of PSCs, interface passivation, inorganic materials and encapsulation strategies were introduced and the stability of PSCs had been enhanced to 11000 hours under the light (AM 1.5G conditions)². Nevertheless, there are a few studies to investigate the metal halide perovskite crystal structure related degradation mechanisms. Therefore, we propose to observe perovskite materials degradation process under light or temperature stress using in-situ grazing incidence wide-angle X-ray scattering (GIWAXS) and grazing incidence small angle X-ray scattering (GISAXS), which will broaden our understanding of degradation mechanisms of metal halide perovskite materials. Moreover, after understanding degradation mechanisms of metal halide perovskite materials, potential solutions can be found to suppress the degradation process of these materials.

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