

Morphology of Perovskite-based Hybrid Solar Cells

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Organometal halide perovskites have been shown to be great candidates for photovoltaics, owing to the strong absorption, and high mobility and diffusion length of photo-generated charge carriers. Subsequently, solar cells employing perovskite thin films have reached efficiencies of more than 20%, making them comparable with commercially available silicon solar cells. The performance of perovskite solar cells greatly depends on their crystal morphology. We fabricate and characterize different cells by varying processing parameters including film deposition methods, annealing temperature and solvent media. By means of X-ray scattering methods, we gain insight into the inner film morphology and thus are able to correlate morphology and photovoltaic performance, with the target to get better fundamental understanding. Especially, in-operando X-ray measurements performed on a photovoltaic device shed light on their degradation under operating conditions.

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