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Effects of organic halides and substrates on the perovskite crystal growth. SUBHA SADHU, WEIXIN HUANG, SYLWIA PTASINSKA, University of Notre Dame — Fabrications of a crystalline perovskite thin film on transparent conducting oxide (TCO) substrates have enormous significance in the area of photoelectrochemical (PEC) research, owing to its unique optoelectronic properties. Though there are numerous reports of synthesis of inorganic-organic perovskite crystals, our understanding of the basic properties and the chemistry behind the growth of these nanocrystals remain still to be the major challenge. In this contribution, we have investigated the influence of organic halides on the nucleation and growth of crystalline perovskite thin films on different substrates. Morphological and optical properties of these films were studied by using several experimental techniques. The as-synthesized methyl ammonium lead iodide thin film exhibits a strong absorption peak at ~ 500 nm and a sharp absorption edge due to well-ordered microstructures. Comparing the relative intensities of the Raman band at 110 cm^{-1} the inhomogeneity of the film in the microscale was exposed to be caused by different degradation rates at the grain boundary. Our study aims in achieving uniform perovskite thin films on various TCO substrates, which can be used for construction of improved PEC devices.

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