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In-situ GIWAXS measurements on 2-step slot-die printed thin-film perovskite layers for solar cell application

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Reaching minimodule efficiencies of around 17% in 2018 and 15% on ultrathin flexible substrates, commercialisation of thin-film organic-inorganic metal halide perovskite based solar cells (PSCs) is very promising as next generation solar cells. However, further improvement on upscaling is needed to push for commercialization. In principle, industrial requirements for fabrication can be met by roll-to-roll slot-die coating. In-situ GIXS measurements are well suited for kinetic studies and deliver stochastically relevant information from a relatively large sample area. In-situ GIWAXS measurements were performed on 2-step deposited methyl ammonium lead iodide (MAPI) films during the annealing process. Slot-die printed samples were compared with spin coated samples. MAPI thin films were prepared on glass coated with ITO and PEDOT:PSS. Annealing kinetics, changes in crystal structure and crystal orientation of printed thin films were analyzed and compared to spincoated samples.

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