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The morphology of perovskite solar cells

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In recent years lead halide perovskites, especially those based on methylammonium lead iodide (MAPbI3), have attracted increasing attention as a new solar cell material due to a rapid increase in the power conversion efficiency (PCE) from 3.9% in 2009 to 20.1% in 2015 for solar cells fabricated with MAPbI3 as the active layer. Despite the quick increase in PCE the relationship between preparation method, film morphology and solar cell performance is still not fully understood.
We probe this relationship by combining XRD and GIWAXS to investigating the morphology of perovskite thin films prepared by a variety of different methods. We correlate our findings to the photovoltaic performance of solar cells fabricated by these techniques with the aim of establishing a link between film morphology and device performance.

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