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Morphological Optimization of Perovskite Thin Films via Dynamic Zone Annealing YAN SUN, KAI WANG[1], XIONG GONG, ALAMGIR KARIM, University of Akron — Organolead Halide Perovskites have been proved to be excellent candidates for application in low-cost high-efficient solar cells owing to their superior desired optical and electrical properties, as well as compatibility with low-temperature solution-processed manufacturing. However, most perovskites applications in photovoltaics require high quality perovskite films. Although tremendous works on tuning perovskite film morphology have been reported previously, it is still a challenge to realize high quality perovskite film with controllable film uniformity and surface coverage, neither the mechanisms in the formation of perovskite. To address the issues above, here we demonstrate the effect of Dynamic Zone Annealing (DZA) on perovskite morphologies, which is proved as an efficient method to control the structure and morphology in crystalline polymer and block copolymers. Via applying the DZA method, the mechanism in perovskite film formation is studied. Furthermore, by optimizing DZA parameter such as maximum temperature, temperature gradient and zone velocity to control dendritic morphology and the grain growth, enhanced device performance was realized eventually.

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