Abstract Submitted
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Hyperspectral mapping of a single grain of hybrid perovskite using cathodoluminescence microscopy[1] ETHAN TAYLOR, University of Alabama at Birmingham, VASUDEVAN IYER, Oak Ridge National Laboratory, BIBEK DHAMI, University of Alabama at Birmingham, CLAY KLEIN, BENJAMIN LAWRIE, Oak Ridge National Laboratory, KANNATASSEN APPAVOO, University of Alabama at Birmingham — Lead-halide perovskites have gained significant interest in optoelectronics over the last few years. While the performance of hybrid perovskite photovoltaics can now rival those fabricated from silicon, the role of grain boundaries is still under debate. While it is generally assumed that grain boundaries are detrimental due to an increase in non-radiative recombination, in some cases grain boundaries can enhance spatial separation of charge carriers and hence boost device performance. Here we map a single grain of hybrid perovskite using optical emission and cathodoluminescence microscopy to understand the role of grain boundaries on emission below the diffraction limit. The hyperspectral data obtained are decoded with non-negative matrix factorization, revealing components relating to primary band-edge emission, photon recycling, and defect emission.

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