Correlative Scanning Electron and Probe Microscopy Characterization of Inorganic Halide-perovskite-type Materials

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Understanding what limits the performance in wide-gap, halide-perovskite-based solar cells is a critical issue for the design of high-efficiency devices. Therefore, correlating microscopic electrical and optoelectronic properties with macroscopic material and device characteristics is a fundamental task in research and development. One of the wide-gap, halide-perovskite-based materials of interest is $CsPbBr_3$ (band-gap energy of 2.3 eV). We report preliminary results obtained by using scanning electron microscopy (SEM) imaging, energy-dispersive X-ray spectrometry, and cathodoluminescence at room temperature, which allowed for correlating local composition and optoelectronic properties of $CsPbBr_3$ thin films synthesized by spin-coating and evaporation. Additionally, local transport measurements by scanning probe microscopy were performed on the same areas as the SEM analyses. We will discuss the challenges concerning specimen preparation and the issue of damaging by the electron beam.