Controlled Growth of $CsPbBr_3$ Perovskite Nanocrystals

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Colloidal perovskite nanocrystals have recently emerged as one of the most promising materials for solution processed photovoltaics due to their exceptional optoelectronic properties. Perovskite nanocrystals exhibit strong optical absorption, high photoluminescence quantum yield and a widely tunable band gap over the entire visible region. Despite the exceptional properties of these nanocrystals, the usage of them in photovoltaics is limited due to their extreme sensitivity to moisture and high temperatures. All-inorganic $CsPbBr_3$ perovskite nanocrystals with an absorption onset around 530 nm are among the most stable colloidal perovskites. To increase the photovoltaic efficiency of $CsPbBr_3$, the size of nanocrystals has to be altered: increasing the size of nanocrystals lowers their band gap value therefore increasing its light absorption coefficient. We have developed a chemical route, which allowed to grow the as-synthesized nanocrystals from 8 nm to *approx.* 35 nm in lateral dimensions at room temperature. The growth of nanocrystals, their colloidal stability and crystallographic integrity along with increased light absorption were confirmed by performing high resolution Transmission Electron Microscopy (HR TEM) and UV-vis light spectroscopy.

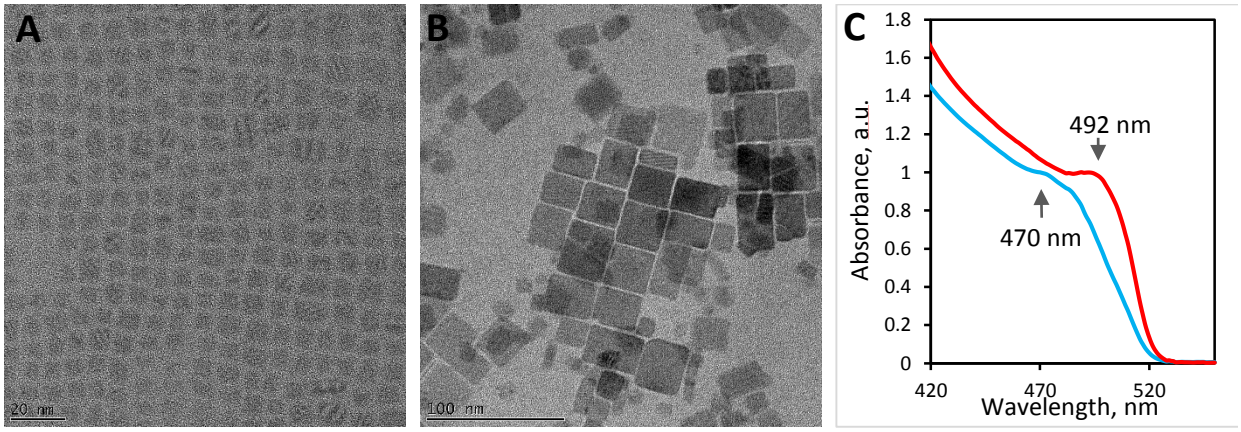

Figure 1. HR TEM images displaying $CsPbBr_3$ nanocrystals growth (a, b); UV-vis absorption spectrum of $CsPbBr_3$ nanocrystals before (blue) and after (red) the growth (c).