NANOSCIENCE COLLOQUIUM

Halide Perovskite Nanocrystals: Synthesis, Properties, Applications

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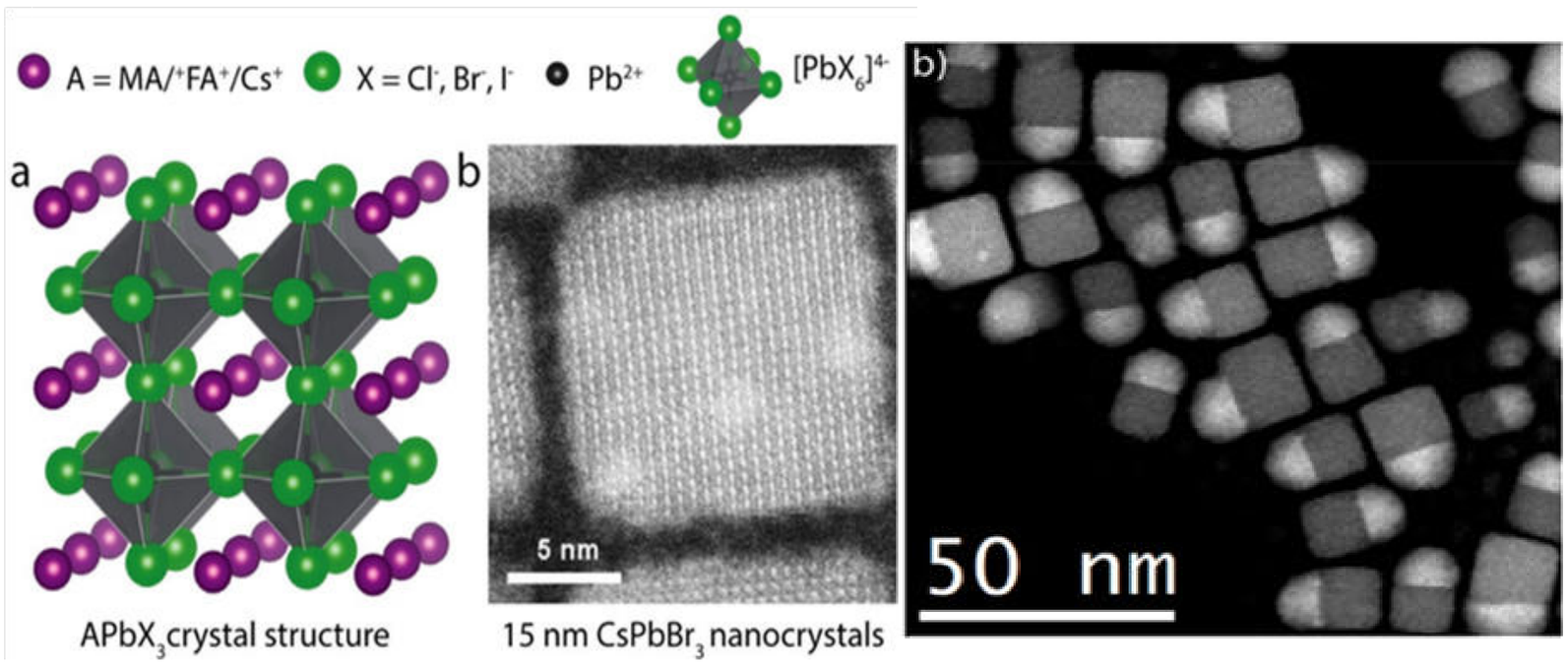
A B S T R A C T : Halide perovskite semiconductors can merge the highly efficient operational principles of conventional inorganic semiconductors with the low temperature solution processability of emerging organic and hybrid materials, offering a promising route towards cheaply generating electricity as well as light. Following a surge of interest in this class of materials, research on colloidal halide perovskite nanocrystal has gathered momentum in the last decade. My talk will highlight several findings of our group on their synthesis, for example our studies on the influence of various exogenous cations on the growth of perovskite nanocrystals. I will also provide an overview of post-synthesis strategies to improve the stability of the nanocrystals and their use in light emitting devices (displays and light emitting diodes) as well as solar concentrations and scintillators. I will then cover our recent work on the growth of perovskite nanocrystals with peculiar shapes (for example hollow structures) and nanocrystal heterostructures, where a perovskite domain is interfaced epitaxially with a domain of another material, and I will discuss their use as photocatalysts. Finally, I will discuss a computational approach developed in collaboration with other groups to identify suitable candidates for epitaxial interfaces at the nanoscale, and not limited to perovskites.



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