MS088.O05

Nucleation and self-assembly of CsPbX3 perovskite nanocrystals

Sudipta Seth[1], Anunay Samanta[1]
[1]*School Of Chemistry, University Of Hyderabad, Hyderabad, India*
E-mail: sseth13uoh@gmail.com

In recent years lead halide perovskites have become a burgeoning topic of research due to their promising optoelectronic applications. As optical and electronic properties of the nanocrystals (NCs) are determined largely by their shape and size, the morphologies of the NCs are crucial to their applications. Unlike tedious hot injection technique, ambient condition, anti-solvent precipitation is a facile and cost effective method for nanoparticle synthesis. CsPbX3 perovskite NCs of six different morphologies are synthesized just by varying the solvent, ligand and reaction time. NCs with dot and cubic shapes are formed as the nucleation product in two solvents of different polarity, namely toluene and ethyl acetate. We have systematically studied the self-assembly of these NCs yielding nanoplates and nanobars in one medium and nanorods and nanowires in another medium by controlling the time interval and ligand concentration. Our findings suggest that polarity of the environment has a major role in determining the shape and size of the resulting NCs. These perovskite nanoparticles are shown to be of excellent crystalline quality with high fluorescence quantum yield. Considering the key role of morphology in nanotechnology, this simple method of fabrication of a wide range of high quality nanocrystals of different shapes and sizes of all-inorganic lead halide perovskites, is likely to help widening the scope and utility of these materials in optoelectronic devices.

Seth. S. & Samanta. A. (2016). Sci. Rep. 6, 37693.

Keywords: CsPbX3, morphology