ABSTRACT:

Perovskite nanocrystals (PNCs) have emerged as potential candidate for photovoltaic and light harvesting devices owing to their excellent optoelectronic properties. However, working on nanoscale of these perovskite nanocrystals has been a challenge due to several factor including stability, high temperature requirement, moisture dependency, requirement of inert medium and agglomeration tendency of the nanocrystals. Our main emphasis is to produce stable CsPbBr 3 nanocrystals inside wormhole mesoporous alumina thin film. These CsPbBr 3 nanocrystals shows tunable blue and green emission. Choice of suitable solvents and precursor incorporation sequence enables generation of CsPbBr 3 nanocrystals at room temperature inside mesoporous alumina film whereas tunable emissive property can be attributed to the size increment of the nanocrystals promoted by differing precursor concentration.
Noble metal nanoparticles have attracted interest of researchers due to their optical properties. Plasmon resonance can be controlled by their size and shape. Our main focus is to synthesize different shaped Pd nanoparticles and study the role of shape in catalysis. Ag nanoparticle has been used in solution based single molecule SERS, but their usage is limited due to toxicity and oxidation issue. Au nanoparticle is biocompatible and SERS active, but they show less SERS enhancement factors. Therefore silver core-gold shell NPs can be alternative for single molecule SERS. Our focus is to synthesize hollow Ag core Au shell nanoparticle and study their potentiality for ultrasensitive SERS detection of biomolecules.