Raquel E. Galian et al., Int J Chem Res. 2020
DOI: dx.doi.org/10.18689/2642-1615.a3.004

Tiny and Bright Semiconductor Nanocrystals

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Semiconductor nanocrystals based on metal chalcogenide (CdSe, CdTe) and lead halide perovskite (APbX3, X= Cl, Br, I) have outstanding optical and electronic properties, such as broad absorption band narrow emission spectrum, good quantum yield which depend on the size, composition and shape of the material. However, the main difference between them is that perovskite reach a 100% of photoluminescence quantum yield without the need of an additional semiconductor shell, as in the case of CdSe/ZnS, due to their high tolerance towards defects.

Different synthetic approaches to get bright emissive quantum dots and how the organic ligands play a key role into the quantum confinement, colloidal stability, dimensionality of the crystalline structure, functionality and dispersibility will be discussed. Regarding to the CdSe based quantum dots, several examples of surface functionalization for sensing applications will be illustrated.

Since our first report on the synthesis of colloidal lead halide perovskite nanocrystals, we focused on the surface chemistry studies using different organic ligands in order to improve their optical properties and stability and to explore the preparation of low-dimensional nanostructures and emissive and conductive films.

Biography:

Raquel E. Galian received her Ph.D in Chemistry at the UNC, Argentina in 2001. She has done several post-doctoral stays in Spain and Canada.Currently, has a Research permanent position at the University of Valencia. Her main interest is the design, synthesis and characterization of semiconductor nanomaterials and multifunctional nanoplatform. She is author of 60 per-review publications including two Book Chapters andpresented more than hundred contributions to conferences and several invited talks in Hong Kong, Argentina, Italy and Germany. Currently, she is Guess Editor in Nanomaterials Journal, Issue “Synthesis and applications of nanomaterials based on perovskites”.