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Rational Design of Organic-inorganic Metal Halide Perovskites with Deep Blue Emission and Encapsulation in Metal Organic Frameworks as a Stable Platform with Improve Emission Characters

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Organic-inorganic metal halide perovskites (OIMHPs) is one of the most interesting and exciting nanoscale optoelectronic materials that has recently received attention [1]. Having excellent optoelectronic properties, high quantum efficiency, flexible adjustment of the emission wavelength, wide and adjustable absorption range, high absorption coefficient, adjustable band gap and high charge carrier mobility have made it used in devices be used [2]. However, an important problem of Metal halide perovskites, especially OIMHPs, is their instability to light, heat, oxygen, ultraviolet (UV) radiation, and other stimuli that cause the loss of the primary crystal structure and decomposition or aggregation [3]. The synthesis of OIMHPs with deep blue emission and their stability is a great challenge for future research in various fields of application. One of the ways to overcome the unstable problem of their coating is by using protective shells such as metal-organic frameworks (MOFs) [4,5]. In this work, a new OIMHPs with deep blue emission and maximum PL emission peaks of locate at 397 nm (λex = 320 nm) was synthesized by ligand-assisted reprecipitation technique (LARP) method, then it was placed in the MOF-5 mesostructure in order to improve the stability and increase the luminescence. OIMHPs /MOF-5 composites

powder resulting has stronger deep blue emission, higher photoluminescence intensity and higher thermal and environmental stability than OIMHPs.

Keywords: Organic-inorganic metal halide perovskites (OIMHPs), Metal-organic frameworks (MOFs) , Deep blue emission, Photoluminescence, Shell

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