

Poster Presentation

MS83.P33

Synthesis and Structure of novel Luminescent lanthanide organic frameworks.

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Lanthanide-Organic frameworks (LnOFs) are currently attracting increasing attention due to their excellent luminescence properties, in which both Ln³⁺ and organic linkers can be used to give rise to luminescence materials with increased brightness and emission quantum yield [1,2]. Lithium doped MOFs are of particular interest due to the recent studies showing enhanced H₂ uptake, as well as promising candidates for replacing the conventional electrode in Li-ion batteries [3,4]. Herein, novel Lithium-lanthanide frameworks based on a rigid dicarboxylic acid, formulated as [LiLn(BDC)₂(H₂O)•2(H₂O)] (Ln = Y, Dy, Ho, Er, Yb, Y_{1-x}Eu_x, Y_{1-x}Tb_x and H₂BDC = Terephthalic acid), have been obtained as single phases under hydrothermal conditions. The crystal structures were solved by single-crystal X-ray diffraction and the bulk characterized by powder X-ray diffraction (PXRD), thermal analyses (TG-MS and DSC), vibrational spectroscopy (FTIR), scanning/transmission electron microscopy (SEM-EDX, TEM, SAED, STEM-EDX), and powder X-ray thermodiffraction (HT-XRD). All compounds are isostructural (monoclinic P2₁/c, a = 11.6365(7) Å, b = 16.0920(2) Å, c = 13.2243(8) Å and β = 132.23(1)° for Ln = Y [5]) and possess a 3D framework with 1D trigonal channels running along the [101] direction contain water molecules. The structure is built up of unusual four-membered rings formed by edge- and vertex-shared {LnO₈} and {LiO₄} polyhedra. The four-membered rings are isolated and connected to each other via carboxylate groups. Topologically, the 3D framework belongs to a new 2-nodal 3,10-c net with point symbol of {4.5²}₂{4¹⁴.5¹⁰.6¹⁸.7.8²}. HT-XRD reveals that the compounds undergo phase transformation upon dehydration process which is a reversible process involving a spontaneous rehydration characterized by fast kinetic. The luminescence properties of selected compounds are also studied.

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Keywords: Metal Organic Frameworks, Lanthanides, luminescence