Lanthanide organic frameworks structures: A study of construction

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Coordination polymers, also known as metal–organic frameworks (MOFs) or lanthanide organic frameworks, have been reported due of their promising applications in gas storage, separation, catalysis, luminescence, magnetism, drug delivery, and so on. As a type of organic–inorganic hybrid materials, the properties of coordination polymers could be chose by deliberately selecting the organic or inorganic components. Lanthanide–organic frameworks have received considerable attention due to their properties such as porosity, luminescence and magnetism.

Solvothermal synthesis was employed to obtain $YT_2F(H_2O)(DMF)$, by using terephthalic acid (T), formate (F), Ytrium, DMF and water for 4 days under 160°C. The semi-rigid 1,4 – benzodicarboxylic acid coordinates with Ln^{3+} ions and is possible to form a polyfunctional bridge. Methods such as solvothermal synthesis are important as a strategy to control the structural and morphological properties as well as the composition of the target compounds.

The final products were characterized by single X-ray diffraction (XRD), fourier transform infrared spectroscopy (FTIR), dispersive spectroscopy (EDS) and thermogravimetric analysis (TGA). The X-ray diffraction (XRD) is an effective method to investigate crystalline properties of a synthesized material. The solid crystal obtained in the synthesis show peaks at $2\theta < 10\theta°$, that indicated the MOF formation. The data were solved and refined by treatment absorption Crysalis with corrections of anisotropy, weight and extinction In the FTIR, the peaks at 1589 and 1500 cm-1 correspond to the asymmetric stretching vibration of –COO. The peak at 1383 cm-1 assigned to the symmetric stretching vibration of –COO. The chemical composition of MOF were studied by means of energy dispersive spectroscopy (EDS).

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