Abstract

Cobalt (II)-Imidazolate Nanoparticles: Aqueous Synthesis and Physicochemical Characterization [†]

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Abstract: During the last few years, Metal Organic Frameworks (MOFs) are being considered as ideal candidates to find more efficient systems for the production and storage of energy [1]. MOFs are characterized by their large specific surface due to ultra-high porosity, tunable pore size distribution and structural tailorability. These characteristics will determine the properties obtained, and derived from them, their potential applications such as clean energy storage [2], CO₂ capture and other separation processes [3,4], biomedical imaging [5], optical luminescence and catalysis [6]. Recently, zeolitic structures based on imidazolate groups as organic ligand (ZIFs) have appeared as an important subfamily of MOFs which present a high surface area, adjustable pore size, thermal stability above 500 °C and high chemical stability in aqueous and organic media. The synthetic route developed for the fabrication of metallic crystalline networks composed of Co²⁺ and 2-methylimidazole is simple, carried out in aqueous medium and at room temperature. The synthetic process used in this work for obtaining MOFs is based on a surfactant method [7] in which different proportions of the constituents were used. The physicochemical characterization and the colloidal stability were carried out by dynamic light scattering (DLS), scanning transmission electron microscopy (STEM) and thermogravimetric analysis (TGA). Furthermore, we investigate the influence of the surfactant Cetyl Trimethyl Ammonium Bromide (CTAB) as well as the use of different solvents on the colloidal stability and the morphology, structure and chemistry of the synthesized systems.

Keywords: Metal Organic Frameworks; Zeolitic Imidazolate Frameworks; physicochemical characterization

Supplementary Materials: The poster presentation is available online at <https://www.mdpi.com/article/10.3390/IOCN2020-07992/s1>.

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