

Two Coordination Polymers Synthesized from Various N-Donor Clusters Spaced by Terephthalic Acid for Efficient Photocatalytic Degradation of Ibuprofen in Water under Solar and Artificial Irradiation

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Abstract : Coordination polymers and uniformly {[Zn(II)(BIPY)(Pht)]_n} (1), {[Zn (HYD)(Pht)]_n} (2) (BIPY = 4,4' bipyridine, Pht = terephthalic acid, HYD = 8-hydroxyquinoline) have been successfully synthesized by a hydrothermal process using aqueous zinc solution. The as-prepared compounds phases were characterized by X-ray diffraction (XRD), Fourier Transform Infrared spectroscopy, UV-visible spectroscopy, thermogravimetric analysis (TGA), and the electrochemistry study by the voltammetry cyclic. The results showed a crystalline phase for CP1 however, CP2 requires recrystallization; the FTIR showed the presence of characteristic bands of all ligands; besides that, TGA shows thermal stability up to 300°C. The electrochemistry study showed a good charge transfer between the ligands and Zn metal for the two components. UV-Vis measurement showed strong absorption in a wide range from UV to visible light with a band gap of 2.69 eV for CP1 and 2.56 eV for CP2, smaller than that of ZnO. This represents an alternative to using ZnO. The Ibuprofen IBP decomposition kinetics of 5.10⁻⁵ mol.L⁻¹ under solar and artificial light were studied for different irradiation conditions. Good photocatalytic properties were observed due to their high surface area.

Keywords : metal-organic frameworks, photocatalysis, photodegradation, organic pollutant, ibuprofen

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