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Hydrothermal Synthesis, Crystal Structures, and Enantio selective Adsorption Property of Bis (L-histidinato) nickel (II) Monohydrate

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Porous materials such as chiral metal-organic frameworks (MOFs) have attracted growing research interest for their application promise in material science, energy storage, asymmetric catalysis, and enantio selective separation of racemic molecules. Despite the numerous researches in MOFs, there are only few reports on biologically important amino acids, histidine in particular, on its use as bridging ligand in the construction of open-framework architectures. In this work, hydrothermal synthesis was used to prepare compounds based on transition metals and histidine. The coordination assembly of imidazole side chain of histidine with divalent nickel ions in aqueous condition yielded violet prismatic solids. Single crystal X-ray diffraction (XRD) analysis showed Ni $(C_6H_8N_3O_2)_2 \cdot H_2O$ that has a monoclinic (*C2*) structure with lattice parameters, $a = 29.41$, $b = 8.268$, $c = 6.314$ Å, $\beta = 90.01$ °. Powder X-ray Diffraction (XRD), Thermo gravimetric Analysis (TGA), Circular Dichroism – Optical Rotatory Dispersion (CD-ORD), and Fourier Transform – Infrared Spectroscopy (FT-IR) are conducted to further characterize the crystals. To investigate the enantio selective property, qualitative assessment of the synthesized MOFs by adsorption study with a racemic mixture of 2-butanol and CD spectroscopy was performed.