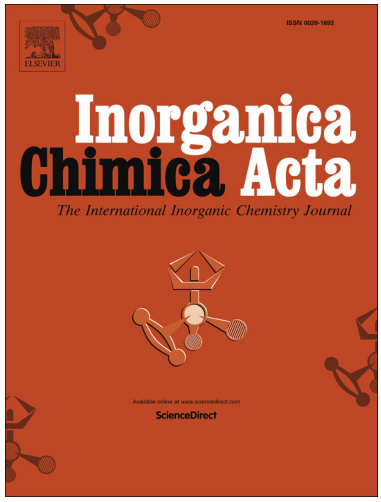

Research paper

Structural Diversities, Magenetic, Luminescence and Photocatalytic Properties of Seven Inorganic-Organic Hybird Supramolecular Complexes Based on 3,5-Dimethyl-2,6-bis(3-(pyrid-2-yl)-1,2,4-triazolyl) pyridine

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ABSTRACT

Seven inorganic-organic hybrid complexes, based on 3,5-dimethyl-2,6-bis(3-(pyrid-2-yl)-1,2,4-triazolyl) pyridine (H_2DBPP), have been obtained under the solvothermal reactions, namely, $[M_2(HDBPP)_2(ox)]$ (M = Co for **1**, Zn for **2**, and Ni for **3**), $[Zn_2(H_2DBPP)_2(ox)]\cdot[Mo_6O_{19}]\cdot 4H_2O$ (**4**), $[M_2(H_2DBPP)_2(ox)]\cdot[\beta\text{-}H_2Mo_8O_{26}]\cdot 2H_2O$ (M = Co for **5**, and Ni for **6**), and $[Ni_2(H_2DBPP)_3]\cdot[\beta\text{-}H_2Mo_8O_{26}]\cdot 5H_2O$ (**7**). Their structures were determined by single-crystal X-ray diffraction analyses and further characterized by elemental analyses, IR spectra, powder X-ray diffraction (PXRD), and thermogravimetric (TG) analyses. Crystal structural analysis revealed that these complexes composed of $[M_2(H_2DBPP)_2(ox)]$ or $[Ni_2(H_2DBPP)_3]$ cations and polyoxometallates interacted by electrostatic interactions and hydrogen bonds. Interestingly, the anions of these complexes took on $[Mo_6O_{19}]^{2-}$ cluster, single $[\beta\text{-}H_2Mo_8O_{26}]^{2-}$ cluster, and twin $[\beta\text{-}H_2Mo_8O_{26}]^{2-}$ clusters by changing the metal ions, and solvents. Besides, the magenetic property of complexes **1**, **3**, **5**-**7**, the solid state luminescence properties of complexes **2**, **4** and the photocatalytic activities of complexes **4**, **7** have been investigated.

Keywords: 3,5-Dimethyl-2,6-bis(3-(pyrid-2-yl)-1,2,4-triazolyl) pyridine, Polyoxometalates, Inorganic–organic hybrid materials, Magenetic property, Luminescent property, Photocatalytic activities.