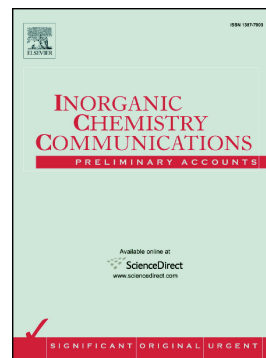


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Two Keggin-based cobalt complexes with a semi-rigid bis-imidazolyl-bis-amide ligand: structures, electrochemical properties and adsorption activities for dyes

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Abstract

Two new Keggin-type polyoxometalate (POM)-based cobalt complexes with a semi-rigid bis-imidazolyl-bis-amide ligand, $[\text{Co}_2\text{L}_2(\text{H}_2\text{O})_4][\text{SiW}_{12}\text{O}_{40}]\cdot\text{L}\cdot 8\text{H}_2\text{O}$ (**1**) and $[\text{CoL}_2(\text{H}_2\text{O})_2][\text{HPW}^{\text{VI}}_{10}\text{W}^{\text{V}}_2\text{O}_{39}]\cdot 5\text{H}_2\text{O}$ (**2**) (L = 1, 4-bis(1*H*-imidazole-4-carboxamido)metaphenylene), have been synthesized under hydrothermal condition, and characterized by IR, PXRD and single crystal X-ray diffraction analysis. The title complexes display different 3D supramolecular structures, which contain 1D metal-organic chain or POM-based inorganic chain. Complex **1** contains three kinds of segments, namely, 1D $[\text{CoL}(\text{H}_2\text{O})_2]_n^{2+}$ chain, discrete $[\text{SiW}_{12}\text{O}_{40}]^{4-}$ polyoxoanion and L ligand. While in the presence of $[\text{PW}_{12}\text{O}_{40}]^{3-}$ polyoxoanion, a kind of POM-based inorganic chain was constructed in compound **2**, and a discrete $[\text{CoL}_2(\text{H}_2\text{O})_2]^{2+}$ metal-organic fragment was formed, which was different from that in **1**. The results indicate that the POMs show great effect on the formation of final various segments and structures. The electrochemical properties and adsorption activities for dyes of complexes **1** and **2** have been investigated.

Keywords: Polyoxometalates; Metal-organic complex; Dyes adsorption;

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