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Three coordination compounds based on Tris(1-imidazolyl)benzene: Hydrothermal synthesis, crystal structure and adsorption performances towards organic dyes

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Abstract: Three coordination compounds, zero-dimensional $\text{Co}(\text{tib})(\text{ADC})_2$ (**BUC-60**), one-dimensional $\text{Zn}_3(\text{tib})_2\text{Cl}_6$ (**BUC-61**) and three-dimensional $[\text{Cu}_2(\text{tib})_2(\text{MoO}_4)\text{Cl}]\text{Cl}$ (**BUC-62**), were obtained from the reaction of 1,3,5-tris(1-imidazolyl)benzene (**tib**), 1,3-adamantanedicarboxylic acid (H_2adc), phosphomolybdic acid hydrate ($\text{H}_3\text{PO}_4 \cdot 12\text{MoO}_3$) and the corresponding metal salts under hydrothermal conditions. The as-prepared samples were characterized by single-crystal X-ray diffraction, Fourier transform infrared spectroscopy, CHN elemental analyses, thermal gravity analyses and photoluminescence spectroscopy. **BUC-60** and **BUC-61** exhibit good adsorption performances towards congo red (**CR**) and mordant blue 13 (**MB13**). The maximum adsorption capacities of **BUC-60** and **BUC-61** toward **CR** are 1949 and 1992 mg g^{-1} , respectively, along with those towards **MB13** being 564 and 209 mg g^{-1} , respectively. In addition, **BUC-60** can selectively capture anionic dyes molecules from a dye matrix.

Keywords: Coordination compound, 1,3,5-tris(1-imidazolyl)benzene, adsorption, organic dyes, separation

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