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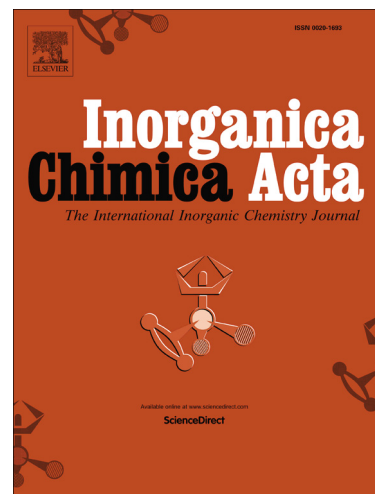
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A Dual Linker Metal-Organic Framework Demonstrating Ligand-Based Emission for the Selective Detection of Carbon Tetrachloride

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Abstract: A novel luminescent metal-organic framework (LMOF) was synthesized through the incorporation of a molecular fluorophore and an anthracene-based colinker into a Zn-based structure. The compound crystallizes in a body-centered orthorhombic crystal system (space group: *Imma*). The three-dimensional porous network of $Zn_4(ad_4)_4(tppe)$ (LMOF-271) exhibits no interpenetration and is classified as a 2-nodal, (4,6)-c net (sqc124 type) with (4-c)(6-c)₂ stoichiometry. LMOF-271 contains two-dimensional sheets of paddle-wheel-type Zn-SBUs interconnected by anthracene-based colinkers, with tetradentate chromophores linking the nets together. Pristine LMOF-271 emits blue light ($\lambda_{em} = 475$ nm) upon UV excitation ($\lambda_{ex} = 365$ nm). LMOF-271 selectively detects the toxic environmental contaminant carbon tetrachloride over similar volatile organic solvents, namely dichloromethane and chloroform. This work represents the first study making use of a LMOF to selectively and effectively detect carbon tetrachloride via luminescence signal change with a high K_{SV} value of $48,903 \text{ M}^{-1}$ and a detection limit of 22 ppb.

Keywords: luminescent metal-organic framework, ligand-based emission, VOC detection, Stern-Volmer Analysis

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