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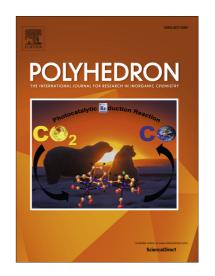
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Syntheses, structures, luminescent and gas adsorption properties of five new interpenetrated, 2D and 3D metal-organic frameworks based on a semi-rigid bis(imidazole)-carbazole ligand

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Abstract: we have succeeded in constructing five metal-organic frameworks, $[Zn(L)SO_4]$ (1), $[Zn(L)(bdc)] \cdot H_2O$ (2), $[Zn(L)(abdc)] \cdot 0.5H_2O$ (3), $[Zn(L)(oba)] \cdot 2H_2O$ (4) and [Zn(L)₂(suc)₂] (5), based on a semi-rigid bis(imidazole)-cardazole ligand [9-ethyl-3,6-di(1H-imidazol-1-yl)-9H-carbazole (L)] and five rigid/flexible dicarboxylic acids (DPac = 2,6-pyridine dicarboxylic acid, H₂bdc = p-phthalic acid, H₂abdc = azobenzen-4, 4'-dicarboxylate, H₂oba = 4, 4-oxybisbenzoic acid and H₂suc = succinic acid). Complexes 1-5 were characterized by single crystal X-ray diffraction, elemental analysis, power X-ray diffraction (PXRD), IR spectroscopy and thermogravimetry. Complex 1 possesses a two-dimensional (2D) network which is constructed not by the co-ligand acid but by a sulfate anion. Both complexes 2 and 3 are two-dimensional (2D) sheet structures with $2D\rightarrow 3D$ polycatenation frameworks. Coordination polymer 2 contains interconnected 70-membered macrocycles and 3 forms a double helix-like 4-fold interpenetrated network. Complex 5 exhibits a three-dimensional (3D) sra network. The luminescent properties of 1-5 in the solid state and gas adsorption properties of 3 and 5 were also investigated.

Keywords: Interpenetrated/2D/3D metal-organic frameworks; Semi-rigid diimidazole ligand; Rigid/flexible dicarboxylates

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