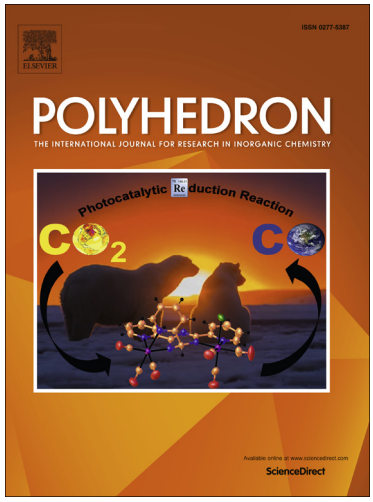

Syntheses, structures, luminescent and gas adsorption properties of five new interpenetrated, 2D and 3D metal-organic frameworks based on a semi-rigid bis(imidazole)-carbazole ligand

Shu-Fang Zhang, Fang Xiong, Zhan He, Yue Liang, Jun-Ru Xue, Lin-Hai Jing, Da-Bin Qin

PII: S0277-5387(15)00486-6
DOI: http://dx.doi.org/10.1016/j.poly.2015.08.040
Reference: POLY 11508

To appear in: *Polyhedron*

Received Date: 16 May 2015
Accepted Date: 17 August 2015

Please cite this article as: S-F. Zhang, F. Xiong, Z. He, Y. Liang, J-R. Xue, L-H. Jing, D-B. Qin, 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, *Polyhedron* (2015), doi: http://dx.doi.org/10.1016/j.poly.2015.08.040

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

Shu-Fang Zhang, Fang Xiong, Zhan He, Yue Liang, Jun-Ru Xue, Lin-Hai Jing and Da-Bin Qin*

Key Laboratory of Chemical Synthesis and Pollution Control of Sichuan Province, College of Chemistry and Chemical Engineering, China West Normal University, Nanchong 637002, China.

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, H_2bdc = p-phthalic acid, H_2abdc = azobenzen-4, 4'-dicarboxylate, H_2oba = 4, 4-oxybisbenzoic acid and H_2suc = 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→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

*Corresponding author Tel.:+86-817-2568081.
E-mail address: qdbkyl@cwnu.edu.cn (D.-B. Qin)