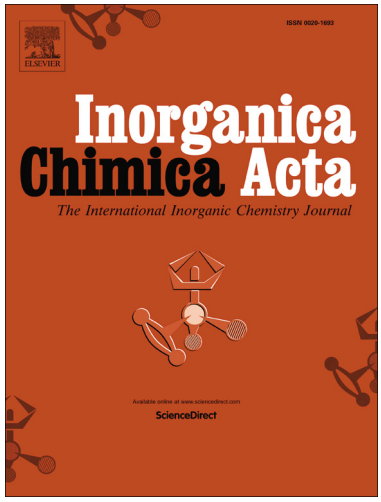

Research paper

A family of entangled coordination polymers constructed from a flexible bisimidazole ligand and versatile polycarboxylic acids: syntheses, structures and properties

Siyu Liu, Yongnian Yan, Mingming Guo, Huadong Guo, Xianmin Guo, Eugeny Alexandrov

PII: S0020-1693(16)30595-3
DOI: http://dx.doi.org/10.1016/j.ica.2016.09.044
Reference: ICA 17289

To appear in: *Inorganica Chimica Acta*

Received Date: 28 June 2016
Revised Date: 23 September 2016
Accepted Date: 23 September 2016

Please cite this article as: S. Liu, Y. Yan, M. Guo, H. Guo, X. Guo, E. Alexandrov, A family of entangled coordination polymers constructed from a flexible bisimidazole ligand and versatile polycarboxylic acids: syntheses, structures and properties, *Inorganica Chimica Acta* (2016), doi: http://dx.doi.org/10.1016/j.ica.2016.09.044

A family of entangled coordination polymers constructed from a flexible bisimidazole ligand and versatile polycarboxylic acids: syntheses, structures and properties

Siyu Liu,[a] Yongnian Yan,[a] Mingming Guo,[a] Huadong Guo,[a]* Xianmin Guo[a]* and Eugeny Alexandrov[b]*

[a] Department of Chemistry, Changchun Normal University, Changchun 130032, People's Republic of China

[b] Samara Center for Theoretical Materials Science (SCTMS), Samara National Research University, Ac. Pavlov St 1, Samara, Russia 443011

* Correspondence authors

E-mail: hdxmguo@163.com (H.-D. Guo) Tel/Fax: +86-431-86168210; xian_min@hotmail.com (X.-M. Guo) Tel/Fax: +86-431-86168210; aleksandrov_ev1@mail.ru (E. Alexandrov) Tel/Fax: +7-846-3356798

ABSTRACT

A family of entangled coordination polymers, namely, [Cd(cba)(ibpi)] (**1**), [Cd(sdc)(ibpi)]·H_2O (**2**), [Cd_2(bpdc)$_2$(ibpi)$_2$] (**3**), [Ni_2(sdc)$_2$(ibpi)$_2$(H_2O)$_2$]·H_2O (**4**), [Cd_2(tdc)$_2$(ibpi)]·H_2O (**5**), [Cd(Hbtc)(ibpi)] (**6**), [Co_2(tdc)$_2$(ibpi)$_2$·H_2O]·2H_2O (**7**) and [Cd_2(cdc)$_2$(ibpi)$_2$]·2H_2O (**8**). [ibpi = 1-(4-(4-(1H-imidazol-1-yl)benzyloxy)phenyl)-1H-imidazole, H_2cba = 4,4'-carbonyldibenzoic acid, H_2sdc = 4,4'-sulfonyldibenzoic acid, H_2bpdc = biphenyl-4,4'-dicarboxylic acid, H_2cdc = 1,4-cyclohexanedicarboxylic acid, H_2tdc = thiophene-2,5-dicarboxyl acid, and H_3btc = 1,3,5-benzenetricarboxylic acid], have been synthesized and structurally characterized. Compound **1** exhibits a 2-fold parallel interpenetration of **sql** networks. Compound **2** presents a 3-fold parallel interpenetration of **sql** networks. Compound **3** features a parallel polycatenation of 3-fold interpenetrated **sql** networks. Compound **4** shows a unique type of inclined interpenetration of **sql** networks. Compound **5** displays a 3-fold interpenetration of **pcu** network. Compound **6** exhibits a uninodal self-catenating **mab** network. Compound **7** shows an 8-connected self-catenating framework of **8T10** topology with the point symbol ($4^{20}\cdot6^8$). Compound **8** presents a unique 8-connected **8T21** self-catenating framework with the point symbol ($4^{24}\cdot6^4$). The thermal stabilities and photochemical properties of compounds **1**, **2**, **3**, **5**, **6** and **8** have also been studied.

Keywords: Coordination polymers; Entanglement; Topology; Luminescence

Introduction

Over the past few decades, coordination polymers (CPs) have increased much attention owing to their intriguing structural diversity and potential applications in catalysis, gas sorption/separation, luminescence, magnetism, and so on.[1, 2] A fascinating structural feature in the field of CPs is the construction of entangled systems, which are discussed in several excellent reviews.[3] The exploitation of such structures can be helpful for understanding the relationships between the structure and function of these coordination polymers. Among versatile entangled systems, interpenetrating, polycatenating and self-catenating networks are extensively investigated. The former can be described as a number of individual nets participating in interpenetration with each other. In polycatenating systems