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Title:

Porosity and crystal morphology of heterometallic coordination networks from β-diketonate ligands.

Authors & affiliations:

Lucia Carlucci and Silvia Rizzato
Università degli Studi di Milano, Dipartimento di Chimica, Via C. Golgi 19, 20133 Milano, Italia,
e-mail: lucia.carlucci@unimi.it, silvia.rizzato@unimi.it

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Porous coordination polymers (PCPs) or metal-organic-frameworks (MOFs) are considered very promising porous materials that can be exploited in many different technological fields such as gas storage, heterogeneous catalysis and separation of mixtures. In the field of MOF materials, many efforts are devoted to the search of rational synthetic procedures. Among others, a useful synthetic strategy is the so-called Metalloligand (MLs) approach. MLs are coordination complexes containing suitably oriented *exo* donor-groups that, used in place of organic linkers, can orient the formation of desired homo and heterometallic polymeric architectures [1]. Functionalized chelating ligands suited to obtain useful MLs are β-diketonate molecules.[2]

We report the synthesis and the structural characterization of two families of coordination frameworks obtained through the use of different β-diketonate ligands with copper salts of several counter-ions. The first family of polymers have a two-dimensional layered structure whereas the members of the second family adopt a three-dimensional flexible framework structure.

We have focused our attention to the correlations between the crystal structure, the dimensionality, the topology and porosity of the networks and the crystal morphologies, as well as to the investigation of the surface phenomena during the crystal growing process. Moreover, we have mapped a continuous set of crystal morphologies by controlling experimental variables such as the solvent system, the metal-ligand molar ratio and the nature of the counter-anion. The aim is to develop a method to tune the crystal habit according to the specific requirement of some important applications.[3]

[1] S. Kitagawa, R. Kitaura, S. Noro *Angew. Chem., Int. Ed.*, 43 (2004) 2334.
[2] L. Carlucci, G. Ciani, S. Maggini, D.M. Proserpio, M. Visconti, *Chem. Eur. J*, 16 (2010) 12328.
[3] L. Carlucci, G. Ciani, J. M. Garcìa-Ruiz, M. Moret, D. M. Proserpio and S. Rizzato , *Cryst. Growth Des.*, **2009**, *9*(12), 5024-5034.