Alkali-Templated Malonate Copper(II) Complexes

Fernando S. Delgado[a], Joaquín Sanchiz[a], Catalina Ruiz-Pérez[a], Francesc Lloret[b], Miguel Julve[b], [a]*Laboratorio de Rayos X y Materiales Moleculares. Universidad de La Laguna. Spain.* [c]*ICMol /Departamento de Química Inorgànica. Universitat de València. Spain*. E-mail: caruiz@ull.es; fersdt@ull.es

In the context of our copper(II) malonate complexes studies [1,2], we have synthetized and characterized the compounds of formula $\{[A(H_2O)_n]_2[Cu(mal)_2(H_2O)_m]\}$ (A = Li, Na, K, Rb, Cs).

The structure of these compounds consists of $[Cu(mal)_2(H_2O)_m]^{2-}$ anions and $[A(H_2O)_n]^+$ cations that are held together by means of carboxylate bridges and water molecules leading to three-dimensional networks.

We want to show how the size of alkali metal ion can control the malonate-bridged copper(II) structure, so we have analyzed the networks that both cationic and anionic units build up.

First, the $[A(H_2O)_n]^+$ units are connected through □-oxo bridges affording thus, different cationic structures: dimmers (Li), single chains (Na, K), double helical chains (Rb) and layers (Cs).

Depending on the alkali metal ion the $[Cu(mal)_2(H_2O)_m]^{2-}$ units are linked to other ones through malonate carboxylate bridges to give anionic networks exhibiting different topologies: monomers (Li, Cs), chains (Rb) and layers (Na, K).

We have also studied the magnetic properties of these compounds. The behaviour being ferromagnetic when the copper(II) units are connected through *anti-anti* carboxylate bridges (Na, K, Rb).

[1] Pasán J., Delgado F.S., Rodríguez-Martín Y., Ruiz-Pérez C., Sanchiz J., Lloret F., Julve M., *Polyhedron*, 2003, **22**, 2143. [2] Delgado F.S., Ruiz-Pérez C., Sanchiz J., Lloret F., Julve M., *Cryst.Eng.Comm.*, 2004, **6**, 443.

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