Poster

Structural description and thermal analysis of a new diphenate 1D coordination polymer

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The self-assembly of fascinating coordination polymers (CPs) remains a topical research subject. Materials of interest in terms of applications in several fields, environment, storage, gas separation, catalysis, optoelectronics, etc [1-2]. They result from multifunctional organic ligands combined with metals by coordination bonds, sometimes associated to supramolecular interactions. In this work, we report the Structural description and thermal study of a new complex [Mg(OOC-(C_6H_4)$_2$-COO)(H_2O)$_4$]. The titled complex crystallises in P21/n centrosymmetric space group with ß = 96.361(1)° and Z = 4. The environment around the MgII is octahedral with four water molecules forming equatorial plane and two diphenate occupying axial positions. The ligand, totally deprotonated, is bis-monodentate and ensure the connexion between two magnesium metals. The resulting structure is described as 1D coordination polymer.

The thermal studies shows a restricted range of thermal stability [Tambient-91] °C. The process of decomposition of [Mg(OOC-(C_6H_4)2-COO)(H_2O)$_4$] done in two successive steps, shows an experimental mass loss of 20.82%, occurring in the range [91-217] °C, in agreement with the theoretical percentage 21.41% corresponding to the simultaneous loss of the four coordination water molecules. On the ATD curve, a significant endothermic peak appears at 172.9°C accompanying this first loss. The anhydrous compound exhibits a significant thermal stability in the range [217-411]° C. The decomposition continues in a single step from 411 °C to 553 °C. Above this temperature, and based on mass calculations, we presume that the residual product is magnesium oxide MgO, theoretical percentages of 11.97% is in perfect agreement of experimental one 11.00 %.

It is important to notify that [Mg(OOC-(C_6H_4)$_2$-COO)(H_2O)$_4$] is isostructural to [M(OOC-(C6H4)2-COO)(H2O)4] (M= Ni, Co) and therefore it shows an expected thermal behaviour comparable to that of the latter two[3].

[1] Kitagawa, S., Kitaura, R.., Noro, S. I. (2004). Angew. Chem. Int. Ed., 43, 2334.

[2] Janiak, C., Vieth, J. K. (2010) New J. Chem., 34, 2366.

[3] Rueff, J-M. Pillet, S., Claiser, N., Bonaventure, G., Souhassou, M., Rabu, P. (2002) Eur. J.of Inorg. Chem., 895.