

Investigation of thermal behaviour of Zn(II) malonate coordination polymers with nicotinamide-like pillars

**Diana CHISCA¹, Lilia CROITOR¹, Eduard B. COROPCEANU^{2,3},
Oleg PETUHOV², Marina S. FONARI¹**

¹Institute of Applied Physics of Academy of Sciences of Moldova, Chisinau, R. Moldova

²Institute of Chemistry of Academy of Sciences of Moldova, Chisinau, R. Moldova

³Tiraspol State University, Chisinau, R. Moldova

The rational construction of coordination polymers (CPs), normally existing as infinite crystalline lattices extended from inorganic vertices and organic struts, essentially benefits from the development of crystal engineering strategies. Herein we report the thermogravimetric behaviour of three bidimensional (2D) zinc(II) CPs with composition $\{[\text{Zn}(\text{mal})(\text{nia})(\text{H}_2\text{O})]\cdot\text{dmf}\}_n$ (**1**), $\{[\text{Zn}(\text{mal})(\text{S-nia})(\text{H}_2\text{O})]\cdot\text{dmf}\}_n$ (**2**) and $\{[\text{Zn}(\text{mal})(\text{izo-nia})(\text{H}_2\text{O})]\cdot\text{dmf}\}_n$ (**3**) (where H_2mal =malonic acid, nia =nicotinamide, izo-nia =isonicotinamide, S-nia =thionicotinamide, dmf =N,N'-dimethylformamide), and discuss the influence of the nicotinamide-like ligands on their stability. All compounds were subjected to the combined thermal analysis TG/DTG/DTA in the temperature range of 20-1020 °C, to evaluate the areas of their thermal stability. Up to 195 °C all compounds are losing a water and dmf molecule, the processes being accompanied by endothermic effects. The thermal degradation of **1** and **3** go in the same way, with minimal differences being noted in the decomposition steps: initial removing a formamide molecule from the nicotinamide ligands, then decarboxylation of malonic acid takes place. The decomposition of **2** goes differently: initially the decarboxylation of malonic acid occurs followed by the oxidation of thionicotinamide. As a result, ZnS is formed, which in the presence of oxygen from the air passes in ZnSO_4 and the process results in a mass increasing.

The thermic analysis of the zinc(II) malonate CPs with nicotinamide-like ligands have indicated a similarity in the decomposition processes of complexes containing nicotinamide and isonicotinamide, at the same time, the thionicotinamide ligand degrades thermally at a higher temperature, indicating a more pronounced thermal stability.

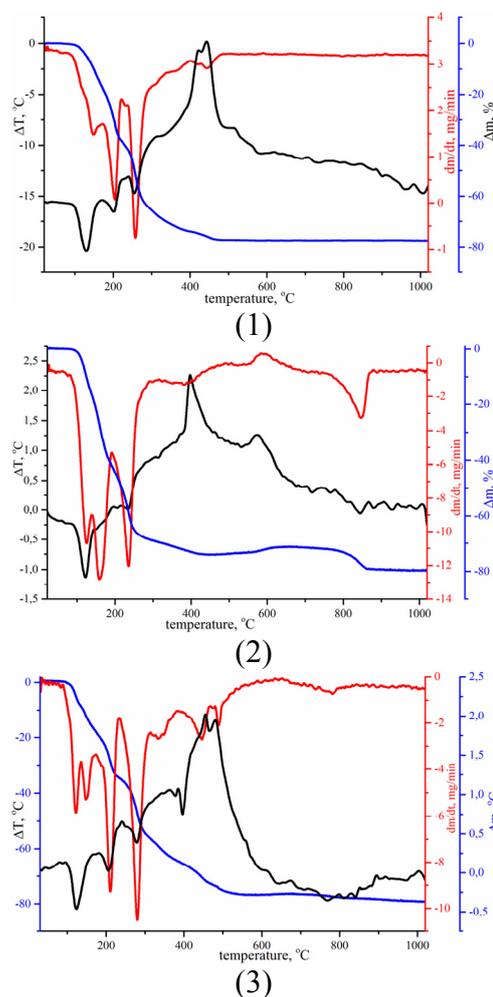


Figure. TG/DTG/DTA patterns of **1-3**

Acknowledgement. D.C. & L.C. thank Grant for Young Scientists (16.80012.02.05F) for financial support.