Thermal analysis of new coordination polymers based on 4,4′-bis((1H-imidazol-1-yl)biphenyl, 1,2,3-benzenetricarboxylic acid or 1,3,5-tris(4-carboxyphenyl)benzene and Co(II), Ni(II), Zn(II)

Irina VODA, Vadim DRUTA, Vasile LOZAN
Institute of Chemistry, 3, Academiei str., MD-2028, Academy of Sciences of Moldova, Chisinau, Republic of Moldova.

Coordination polymers or metal-organic frameworks (MOFs) are a new member in the vast field of porous materials that have gained a tremendous attention in the last two decades because the voids inside the frameworks can accommodate guest molecules for a number of applications. [1] High thermal stability is important for reaching practical implementations of these compounds being a clue for good stiffness, rigidity, robustness and structural integrity estimation.

Four new coordination polymers have been synthesized and characterized from room temperature to 1000 °C under flowing nitrogen atmosphere: $[Co_3(BIBP)_2(BTC)_2(H_2O)_2]_n$ (**1**), $\{[Ni_3(BIBP)_3(BTC)_2(H_2O)_4]\cdot 2H_2O\}_n$ (**2**), $[Zn(BIBPH)(BTC)]_n$ (**3**), $\{[Co(BIBP)_{1.5}(HBTB)]\cdot H_2O\}_n$ (**4**), where BIBP = 4,4′-bis((1H-imidazol-1-yl)biphenyl, BTC = 1,2,3-benzenetricarboxylate, BTB = 1,3,5-tris(4-carboxyphenyl)benzene.

Thermogravimetric trace for **1**, **2** and **4** allowed to identificate the number of water molecules in the internal and external sphere of the complexes. Compound **2** loses 2 water molecules (2%) from the external sphere up to 150 °C and other 4 water molecules (4%) from internal sphere between 250 and 350 °C, that is similar to compound **1** - 2 water molecules (1,5 %) from internal sphere - between 300 and 350 °C. Coordination polymer **4** decomposes into three steps observed on the DTA curve, the compound has a small weight loss of 1 % up to about 340 °C, which corresponds to the loss of water molecules from the crystalline network. One interest was to see the effect of water removal from channels within the structures - in the absence of the guest molecules the compounds are thermally stable up to 250 - 340 °C. Compound **3** is stable up to 230 °C, a sudden loss of 35 % up to 440 °C occurs, then the compound gradually decomposes.

High thermal stability can make these materials eligible in technical processes involving heating.

ACKNOWLEDGEMENTS
This work is supported by Institutional Project 15.817.02.01F. We thank Oleg Petuhov for the thermogravimetric measurement facilities.

[1] R. J. Kuppler, D. J. Timmons, Q-R. Fang, J-R. Li , T. A. Makal, M. D. Young, D. Yuan, D. Zhao, W. Zhuang, H-C. Zhou, Coord. Chem. Rev. 253 (2009) 3042–3066