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MANGANESE-PYROMELLITATE COMPLEX AS A PRECURSOR FOR PREPARATION OF SPINEL Mn_3O_4

Lidija Radovanović¹, Željko Radovanović¹, Aleksandar Kremenović², Bojana Simović³, Milica V. Vasić⁴, Jelena Rogan⁵

¹Innovation Centre of the Faculty of Technology and Metallurgy, Belgrade, Serbia

²University of Belgrade, Faculty of Mining and Geology, Belgrade, Serbia

³University of Belgrade, Institute for Multidisciplinary Research, Belgrade, Serbia

⁴University of Belgrade, Institute for Testing of Materials IMS, Belgrade, Serbia

⁵University of Belgrade, Faculty of Technology and Metallurgy, Belgrade, Serbia

Corresponding author e-mail: lradovanovic@tmf.bg.ac.rs

Abstract

In recent years, thermal decomposition studies of transition metal complexes with benzenepolycarboxylate ligands have become an area of a great importance due to the possibility of obtaining useful metal oxides with desirable electrical, magnetic and catalytic properties [1]. As a contrast to conventional methods for the preparation of metal oxides, such as hydrothermal or sol-gel treatment, thermolysis is faster, more efficient and environmentally friendly. Mn(II)-dipya (dipya = 2,2'-dipyridylamine) complex with tetraanion of 1,2,4,5-benzenetetracarboxylic (pyromellitic, H_4pyr) acid, $[Mn_2(dipya)_2(pyr)(H_2O)_2]$, has been prepared and characterized by elemental, spectral and microscopy analyses. Direct thermolysis of the complex up to 1200 °C in an air atmosphere yielded spinel Mn_3O_4 oxide material. The obtained Mn_3O_4 has been characterized for its structural, spectroscopic, morphological and optical properties. The possibilities of using this oxide as photocatalyst or co-photocatalyst for removing textile organic dyes, as well as inorganic pigmentary material, were also investigated and discussed.

[1] H. Lu, D. S. Wright, S. D. Pike, Chemical Communications 56 (2020) 854.

Keywords: Manganese(II)-complex, thermolysis, Mn_3O_4 , photocatalysis, pigment.