

## SUBSTITUTION EFFECT ON THE PHYSICO-CHEMICAL PROPERTIES IN CREDNERITE $\text{CuMnO}_2$ TYPE MATERIALS

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### Abstract

Recently, the  $\text{ABO}_2$  delafossite-type class of materials, B being a transition element, has attracted a lot of interest. First of all in the field of transparent conducting oxides, thin films of  $\text{CuAlO}_2$  show the unusual combination of high transparency and rather high p-type semi-conductivity [1]. On the other hand, in the field of the exotic magnetic and structural properties, a good example is the  $\text{CuFeO}_2$  delafossite, a triangular lattice antiferromagnet which has been extensively studied over the last years for its multiferroicity [2,3].

The  $\text{ABO}_2$  delafossite structure, where  $A=\text{Cu}$  and  $\text{Ag}$ , and B a transition element, belongs to the R-3m space group and is characterised by O-Cu-O dumbbells linking layers of edge sharing  $\text{BO}_6$  octahedra. However, in this class of materials, crednerite  $\text{CuMnO}_2$  occupies a unique place due to the Jahn-Teller (JT) distortion of the  $\text{Mn}^{3+}$  ( $t_{2g}^3 e_g$ ) which leads to a monoclinic structure (C2/m space group at room temperature) and to a different topology of the magnetic triangular lattice and out-of-plane stacking sequence compared to delafossite structure.

In this work, we investigated the physico-chemical properties of  $\text{CuMn}_{1-x}\text{B}_x\text{O}_2$  (B=Al, Mg;  $x=0 - 0.08$ ) type materials by X-Ray diffraction, SEM-EDAX, thermal analysis, UV-VIS and infrared spectroscopy. The effect of the substitution on the lattice parameter in  $\text{CuMnO}_2$  is significant in order to understand the correlation between the structure and the properties in this compound. The crednerite nanoparticles were synthesized at low temperature by hydrothermal method in teflon-lined steel autoclave.

**Acknowledgment:** This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-2179.

### References

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