

THE INFLUENCE OF ADDITIVES OF COBALT ON STRUCTURE ORDERING OF MANGANESE DIOXIDE PREPARED FROM FLUORINECONTAINNG ELECTROLYTES

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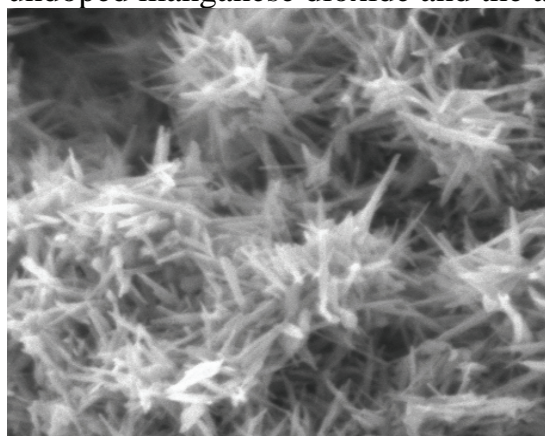
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Electrodeposition is known to be a prospective method of nanopowders and nanofilms preparation. Fluoride containing electrolytes allow fast producing electrolysis products with high defect concentration [1] including manganese dioxide preparation [2]. The addition of dopants at electrochemical synthesis can be the next step of adjustment of phase composition, defects in nanostructured samples.

The electrodeposition of the doped manganese dioxide was studied on a Pt anode in 0.2 M HF containing 0.7 M MnSO₄, 0.001—0.1 mole·L⁻¹ CoSO₄ ($i = 1-6$ A·dm⁻²). The mass content of cobalt in electrodeposited samples varied from 0.007 to 0.19 mass.%. XRD and SEM (Fig. 1) showed that samples are semiamorphous mostly due to nanosized crystallites and significant degree of disorder. FTIR measurements that are sensitive to the short-range order showed changes of the stretching modes of the MnO₆ octahedra when doping by cobalt in comparison with undoped manganese dioxide and the annealed sample that contain Mn³⁺ (Fig. 2).



200 nm

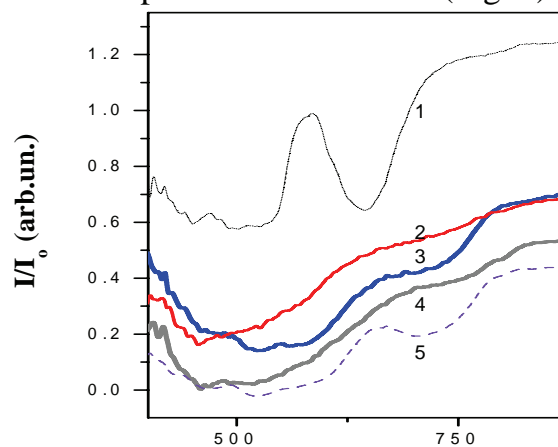


Fig. 1. SEM micrograph of electrolytic manganese dioxide doped by cobalt

Fig. 2. FTIR-spectra of MnO₂ samples doped by cobalt 2-4 and (1) sample 2 annealed at 900^oC; (5) undoped MnO₂ from fluorine containing electrolytes [2].

References

- [1] Ivanova N.D. and Ivanov S.V. Russian Chem. Rev 62 (1993) 907.
 [2] N.D. Ivanova, Ye.I. Boldurev, I.S. Makeeva, G.V. Sokolsky, Zhurn. Prikl. Khimii 71 (1998) 121.