

Optimization of synthesis conditions of nanosized SnO₂ for gas sensors

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The influence of synthesis conditions on the structure of SnO₂ has been studied. Base hydrolysis of Sn(II) and Sn(IV) salts (SnSO₄ and SnCl₄) was carried out to obtain SnO₂ products. Thus generated precipitates were transformed to SnO₂ by two ways: 1) thermal dehydration of Sn(OH)₂ and SnO₂·nH₂O hydroxides; 2) sol→gel→xerogel transformation of the precipitate and further thermal dehydration. The precipitates were peptized with various chemical agents: HNO₃, NH₃·H₂O, H₂SO₄ under ultrasonic treatment. The samples were heated at 500–800 °C in air and in oxygen flow. The structural features of the SnO₂ samples were studied by XRD, EM, ESR and IR-spectroscopy. The influence of the valence state of tin and the nature of the anion (SO₄²⁻) on the structure of the samples, grain size and on concentration of point defects was revealed.