

INVESTIGATION OF TIN CONTAINING ORGANIC COMPLEXES FOR THE PRODUCTION OF NANOSIZED TIN DIOXIDE FILMS

V.S. Grinevich¹, S.N.Savin¹, V.A. Smyntyna¹, L.N. Filevskaya¹
B. Ulug², M. Haluk Turkdemir³, A. Ulug² and Ş. Yaltkaya²

¹-Odessa I.I. Mechnikov National University Odessa, Ukraine, grinevich@onu.edu.ua

²-Akdeniz University, Department of Physics, Antalya, Turkey

³- Uludag University, Department of Chemistry, Bursa, Turkey

Thin films adsorptive sensitive elements based on oxide materials with nanosized grains found wide spread application in modern gas analyzers. Tin dioxide is one of such materials which have good sensitivity to some gases and chemically resistivity to some harmful and poisoning gases. Thus, investigation of the production processes of nanosized oxide materials layers, i.e. tin dioxide, is appeared to be important.

Production technique of Tin dioxide thin films comprises polymers as a structuring additive. In the present work, which is dedicated to the investigation of this complex composition, a complex based on tin acetylacetonate was used as a precursor of tin dioxide.

Problem was realized after the thermogravimetric (TG) and derivatothermographic (DTG) investigation of the tin complex whose usage for the production of tin dioxide thin films promotes the formation of nano sized film structure. As soon as tin tetrachloride and acetylacetonate were mixed the precursor containing tin dichloroacetylacetonate and some impurities containing tin oxides and tin tetraacetylacetonate form immediately.

Two types of tin complexes were investigated: Sample coded as N1 is prepared in Odessa I.I. Mechnikov National University (Odessa, Ukraine) and the one coded as N2 is produced in Akdeniz University (Antalya, Turkey). Production techniques of these complexes are the same except the final drying procedure of the powder which were oven dried in air in ONU and vacuum dried in Akdeniz University.

The weight losses of the samples in TG investigations reveal the compositional difference of the products. DTG data of the sample N1 at 100 °C shows the presence of a water complex. Chloride analyses of both complexes reveal the presence of equal amount of chloride suggesting that dichloroacetylacetonate prevails in the compositions of both complexes.

The present work is supported by Ministry of Education and Science of Ukraine (International Scientific Project M/349-2008) and The Scientific and Technological Research Council of Turkey (TUBITAK) under the grant 107T277.