

Thematic course: Hydrochemical synthesis of metal chalcogenide films. Part 16.

The chemical bath deposition and study of thin films in the system $\text{Cu}_2\text{S}-\text{In}_2\text{S}_3$

© Stanislav S. Tulenin,¹ Vyacheslav F. Markov,^{1*}
Larisa N. Maskaeva,²⁺ and Mikhail V. Kuznetsov³

¹ Department of Physical and Colloidal Chemistry. Ural Federal University Named After the First President of Russia B.N. Yeltsin. Mira St., 19. Ekaterinburg, 620002. Sverdlovsk area. Russia.

Phone: +7 (343) 375-93-18. E-mail: mln@e-sky.ru

² Department of Chemistry and Burning Processes. UISFS of EMERCOM of Russia. Mira St., 22. Ekaterinburg, 620022. Russia. Phone: +7 (343) 360-81-68. E-mail: mln@e-sky.ru

³ Institute of Chemistry of Solid State. Ural Branch of the Russian Academy of Sciences. Pervomaiskaya St., 91. Ekaterinburg, 620990. Russia.

Phone: +7 (343) 362-33-56. E-mail: kuznetsov@ihim.uran.ru

*Supervising author; +Corresponding author

Keywords: chemical bath deposition, copper sulfide(I), indium sulfide(III), thin films, type of conductivity, x-ray photoelectron spectroscopy.

Abstract

For the first time the thin films of $\text{In}_x\text{Cu}_{1-x}\text{S}_y\text{O}_{1-y}$ composition with the content of indium up to 9.63 at% were obtained by means of a chemical bath deposition from the system "indium chloride – copper chloride – sodium hydroxide – tiourea" and "indium chloride – copper chloride – sodium hydroxide – trilon B – tiourea". The experimental data on the distribution and the atomic ration of elements in synthesized patterns obtained by the x-ray photoelectron spectroscopy were discussed. The change in the surface microstructure of thin films depending on the temperature and the composition of reaction bath were determined by means of scanning electron microscopy. The structure of the obtained thin films has *n*-type of conductivity.