Optical and Morphological Properties of Lead Sulphide (PbS) thin Films

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In this work we studied the optical and morphological properties of thin films of lead sulphide (PbS). Lead sulfide (PbS) films have been deposited by chemical deposition method on glass substrates from a solution of lead acetate, Pb $(CH_3COO)_2$, and thiourea, $SC(NH_2)_2$ diluted in water. The deposition is performed in alkaline medium, using sodium hydroxide (NaOH), the starting solution pH being 11. The advantage of this method is simple, relatively inexpensive and easily controlled method that is producing large area films. Some data about the optical properties, structure, composition of the films and thermal stability of the powder samples have been reported.

The structure and crystallite sizes were determined by X-ray diffraction studies. The optical properties were obtained using Fourier transforms infrared (FTIR) spectroscopy. The films are very adherent to the substrates and are polycrystalline. The surface morphology of the as deposited films was studied with a scanning electron microscope. From two to ten, multiple layers have been deposited. The terminal thickness has been determined. Experiments [1] showed that the shape of the product depended on the initial reactants. Under the same experiment condition, $PbCl_2$ and Pb $(NO_3)_2$ were employed as the lead ion source instead of Pb $(CH_3COO)_2$.

[1] Yonghong Ni, Hongjiang Liu, Fei Wang, Yongye Liang, Jianming Hong, Xiang Ma, Zheng Xu, *Cryst. Res. Technol*., 2004, **39**, 3, 200.

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