

DR-4. Ba AND Sr DOPED PbS THIN FILMS PREPARED BY CHEMICAL BATH DEPOSITION

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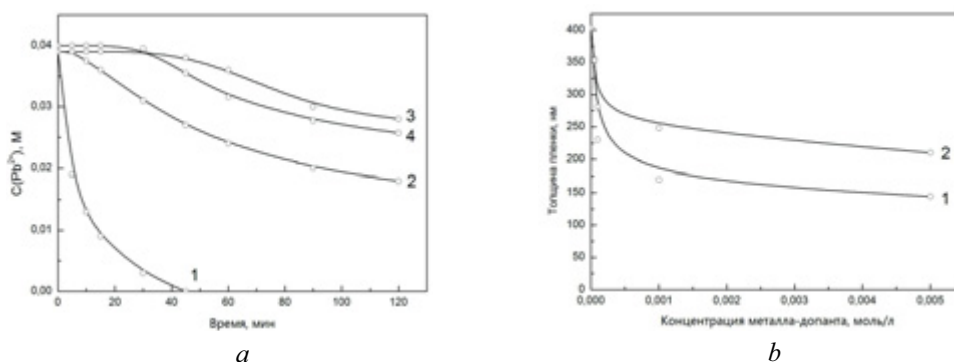
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An important tool for the changing of the semiconductor and photoelectric characteristics of lead sulfide films is the doping of such films with various chemical elements. The effect of metal dopants of the beryllium subgroup on the optical, morphological and photoelectric properties of thin-film lead sulphide is of considerable interest.

In the present work an attempt is made to obtain the chemically deposited PbS films synthesized using thiourea doped with Sr, Ba, to study kinetic of conversion of lead salt to sulfide.

The determination of the concentration of lead ions in the reaction mixture during the study of the kinetic patterns of the transformation of the lead salt to form the solid phase of PbS was carried out by reverse trilonometric titration using Eriochrome Black T indicator.

The studies carried out on the conversion of lead salt to sulfide in the presence of SrCl₂ or BaCl₂ supplement showed a characteristic change in the kinetics of the process. The kinetic curves are S-shaped, which is characteristic of heterogeneous catalytic processes involving the solid phase (Figure, *a*). Introduction to a solution of 0,5 mmol/l SrCl₂ (curve 3) or BaCl₂ (curve 4) compared leads to a slower rate of conversion of lead salt to sulfide compared to the conversion of lead salt to sulfide without additives (curve 1) and with the addition of NH₄I (curve 2).



Kinetic curves for the formation of the solid phase of lead sulphide:

a – PbS (1), PbS : I (2), PbS : Sr (3), PbS : Ba (4); *b* – the thickness of PbS : Sr (1), PbS : Ba (2) thin films

Thin PbS films were precipitated from reaction bath containing Pb(CH₃COO)₂, N₂H₄CS, Na₃C₆H₅O₇, NH₄OH, NH₄I, SrCl₂ (BaCl₂) dopant onto glass and sital substrates at T = 353 K.

By means of hydrochemical precipitation from an ammonia-citrate mixture containing SrCl₂ or BaCl₂ additive shiny light-gray PbS layers with the thickness of 230 to 150 nm, depending of the dopant, were obtained on glass and silicon substrates (Figure, *b*).

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