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Thematic course: Hydrochemical synthesis of metal chalcogenide films. Part 27.

Kinetic study of chemical deposition of silver sulphide by thiocarbamide

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Key words: hydrochemical deposition, thiocarbamide, kinetic study, silver sulphide, formal kinetic equation, activation energy of chemical reaction.

Abstract

The article considers kinetic study of chemical deposition of silver sulphide by thiocarbamide form solutions containing silver nitrate, ammonium hydroxide and sodium citrate at temperatures 303-343 K during spontaneous formation of solid phase. Specific kinetic orders are defined in all components of reaction mixture and activation energy of this process is 37 kJ/mole. In the specified concentration limits formal kinetic equation is derived for the rate of conversion of silver salt into silver sulphide that allows providing aimed regulation of the rate of silver sulphide phase formation in the investigated reaction mixture.

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Тематическое направление: Гидрохимический синтез пленок халькогенидов металлов. Часть 27.

Кинетические исследования процесса химического осаждения сульфида серебра тиокарбамидом

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Ключевые слова: гидрохимическое осаждение, тиокарбамид, кинетические исследования, сульфид серебра, формально-кинетическое уравнение, энергия активации химической реакции.

Аннотация

Исследована кинетика химического осаждения сульфида серебра тиокарбамидом из растворов, содержащих нитрат серебра, гидроксид аммония и цитрат натрия, при температурах 303-343 K в условиях самопроизвольного зарождения твердой фазы. Определены частные кинетические порядки по всем компонентам реакционной смеси и энергия активации процесса, составившая 37.0 кДж/моль. В заданных концентрационных пределах выведено формально-кинетическое уравнение скорости превращения соли серебра в Ag_2S, позволяющее обеспечить целенаправленное регулирование скорости формирования фазы сульфида серебра в исследуемой реакционной системе.