2D nucleation of CdSe on FTO/glass

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Cadmium selenide is an important photovoltaic material due to its high absorption coefficient and optimal band gap (1.7 eV) for efficient absorption and conversion of solar radiation. The influence of nanostructures on the behavior of CdSe anodes in photovoltaic cells leads to an interest in the study of its electrochemical deposition process and the peculiarities of nucleation and growth of semiconductor precipitation. However, the growth processes in the electrochemical deposition of cadmium selenide remain little investigated.

In this research, the kinetics of nucleation/growth of CdSe nanocrystals on the surface of glass covered with fluorinated tin oxide (FTO) during their electrodeposition in the potentiostatic mode is investigated. The use of cyclic voltammetric curves of reduction-oxidation allowed us to identify the optimal range of potentials required for CdSe deposition, which covers the interval from -0,60 V to -0.75 V (relative to Ag/AgCl)[1].

Chronoamperometric conducted research and compared data obtained for various potentials of the selected range of dates.

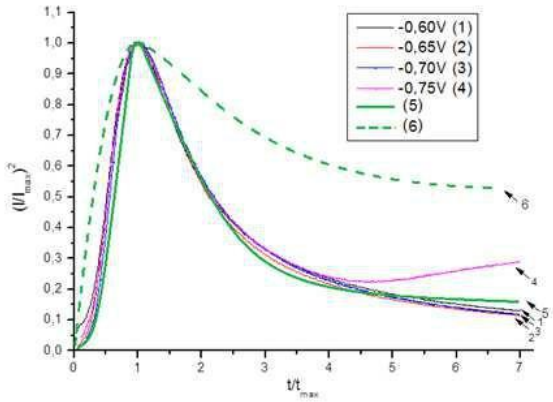

Fig. 25 Comparison of theoretically calculated (5, 6) dimensionless values $(I/I_{max})^2$ with respect to t/t_{max} by experimental data (1-4): 1) E = -0.60 V; 2) E = -0.65 V; 3) e = -0.70 V; 4) E = -0.75 V; 5) progressive nucleation; instantaneous nucleation

The study of the kinetics of the nucleation and growth of electrodeposited CdSe by chronoamperometry allowed us to determine that during the process of electrodeposition in a sulfate electrolyte with the addition of Se and Cd salts (with the predominance of Cd ions over Se ions) there takes place a two-dimensional growth of CdSe (2D) according to the laws of progressive nucleation (Fig. 25).

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