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THE INVESTIGATION AND MODELING OF TWO METALS CODEPOSITION PROCESS

by

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Abstract. A codeposition of bismuth and lead from $\text{Bi}^{3+}/\text{Bi}^{2+}/\text{Bi}^+/\text{Bi}^0$ and $\text{Pb}^{2+}/\text{Pb}^+/\text{Pb}^0$ systems in 0.5 M KNO_3 (pH=1) was investigated by cyclic voltammetry technique. The process was recognized as electrocatalytic and depicted by the two-plate model including Brunauer, Emmett and Teller (BET) adsorption expression. The model recreates all of the not resolved responses of two electronation/deelectronation couples. An alteration of electrode surface throughout electrode reaction is integrated with the model. It was proved that cyclic voltammetry (CV) method and two-plate approach is adequate to achieve a complete depiction of considered codeposition process. The estimated values of electrochemical kinetic parameters as well as the two-plate model with its BET adsorption expression were validated and discussed.

Keywords: metal deposition/dissolution process; codeposition; mathematical modeling; electrocatalysis; BET adsorption model.

1. INTRODUCTION

Electrochemical deposition and codeposition of metals is an important problem in several fields of science and technology. Precisely, deposition of alloys in material science and electronics [1-7], analysis of toxic metals with the use of Bi codeposition [8-15],

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