

ELECTROCHEMICAL DEPOSITION AND DISSOLUTION OF THALLIUM OXIDE (III)

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ABSTRACT. The regularities of precipitation and dissolution of thallium (III) oxide were studied by using cyclic and linear voltammetry. It is established that at 1.5V potential, a peak corresponding to the process of oxidation of monovalent to trivalent thallium is observed, according to: $Tl^+ \rightarrow Tl^{3+} + 2e^-$. Two peaks are observed in the cathode region, at 0.65V and -0.17V potential values. At $E = -0.17V$, the thallium oxide Tl_2O_3 dissolves, as at $E = 0.65V$, the intermediate products of the hydrolysis of trivalent thallium ($Tl(OH)^{2+}$, $Tl(OH)^{2+}$) are probably recovered. It was found that with increase of solution pH, the dissolution processes of thallium oxide intensified, while the optimum pH value was 11, also activation energy of the electrodeposition of thallium(III) oxide were calculated.

Keywords: thallium, thallium(III) oxide, electrolysis, voltammetry, precipitation, dissolution/solution.

INTRODUCTION

Today it is difficult to call the field of technology that would not use rare metals, their alloys and various compounds. Due to its physical-chemical properties, thallium, as well as its compounds of high purity, is widely used in many fields of science and technology. In particular, metal thallium is used to obtain bearing and low-melting alloys, in semiconductors, as a source of β -radiation it is used in radioisotope devices [1-3]. Alloys containing thallium have increased resistance, inertness with respect to acids, low melting point.

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