

Streszczenie pracy doktorskiej w języku angielskim

The doctoral thesis entitled: **“Effects of protonation of some amino acids on the parameters of the double Hg/ chlorates(VII) interface as well as kinetics and mechanism of Bi(III) ions electroreduction”** presents the investigations which describe the electrode process of Bi(III) ions in chlorates(VII) and in the presence of homocysteine, homocystine and ethionine.

Research methodology is mainly based on electrochemical techniques such as: direct current polarography (DC), square wave voltammetry (SWV) and cyclic voltammetry (CV) as well as electrochemical impedance spectroscopy (EIS) which allowed to determine adsorption and kinetic parameters. These parameters indicated adsorption of organic substances at the Hg/ chlorate(VII) interface and the amount of catalytic effect on amino acids as well as enabled correlation with water activity.

In the course of investigations the ratio of chloric acid(VII) and sodium chlorate(VII) was changed in the basic electrolyte obtaining different protonation of the chosen amino acids. It was stated that homocysteine, homocystine and ethionine adsorb on the mercury electrode, catalyze Bi(III) ions electroreduction following the “*cap – pair*” rule. The presence of the active Bi – ET or Bi – Hg(SR)₂ complexes intermediating in the electrons transfer and situated in the adsorption layer was taken into account in the multistage mechanism of the electrode process. The first chemical stage of unstable complexes formation proved to be the most essential. It determines the kinetics of the whole Bi(III) ions electroreduction process. Different structures and properties of the active Bi – ET or Bi – Hg(SR)₂ complexes can be the reason for the differentiated catalytic activity. The greatest catalytic activity was observed in 2 mol·dm⁻³ chlorates(VII) for the largest amount of sodium salt of chloric acid(VII).