ABSTRACT

The subject of this doctoral thesis concerns the study and analysis of polycondensation reactions occurring at the polarized liquid-liquid interfaces. Concerned thesis is based on research results published in four scientific articles from the JCR list and one article which is published in chemical repository and also being submitted to the JCR journal. The theoretical part concerning the electrochemistry of soft junctions was prepared on the basis of the author's chapter in the monograph published in the journal Wiadomości Chemiczne.

The subject of this work is focused on possibilities to electrochemical control the interfacial polycondensation reactions at polarized liquid-liquid interfaces, this is, the synthesis of polyamide materials, and their further interfacial (and electrochemically controlled) modification with metallic nanoparticles. In addition, the formation of titanium dioxide at the electrified liquid-liquid interface and electroanalytical studies of interfacial behaviour of five carbosilane dendrimers were tested and described in this work.

The starting point of the experimental part of this work were the studies focused on the electrochemically controlled synthesis of nylon-6,6 at the polarized liquid-liquid interface. This material was successfully obtained in an electrochemically controlled manner, and further modified with silver-based nanoparticles via heterogenous interfacial electron transfer reaction between metal precures from the aqueous phase and electron donor from the organic phase. By developing a general mechanism for the synthesis of polyamides at polarized liquid-liquid interfaces, five other materials were produced in an electrochemically controlled manner. Using the miniaturized ITIES system, the synthesized polyamides were characterized in terms of their molecular screening properties.

Also, the dendrimers were supposed to be used to induce porosity of titanium dioxide during its interfacial polycondensation at the electrified liquid-liquid interface. Unfortunately, the expected results were not achieved. Electrochemical control of the