

Abstract

The main sources of energy in the world are unrenewable sources. However, its reserves should last for next few tens of years and it is necessary to substitute them with alternative sources. Fuel cells are one of the most promising alternative sources of clean energy because they convert the chemical energy of hydrogen into electrical energy with the only byproduct pure water. There exist a wide range of fuel cells and the most important type is the fuel cell with a polymer membrane because it is suitable for mobile applications.

One of the main problems of fuel cells is their price. Platinum catalyst enables chemical reactions and the necessity of platinum rises its price. Nowadays, the most promising strategy for overcoming this obstacle is doping platinum with other metals. Bimetallic platinum alloys increase the catalyst's activity and simultaneously decrease its price.

This thesis is focused on investigation of catalyst for fuel cell made of platinum-nickel alloy. The catalyst was prepared by magnetron sputtering technique and then its other properties were measured with respect to the amount of platinum and nickel. The goal of this thesis is to study the link between chemical composition and activity of bimetallic layers.