

Title: *Growth of nanoparticles in liquid medium using magnetron sputtering technique*

Author: *Josef Kučera*

Department: *Department of Surface and Plasma Science*

Supervisor: Mgr. Yurii Yakovlev, Ph.D., Department of Surface and Plasma Science

Abstract:

This thesis investigates the preparation of platinum and platinum-ruthenium alloy nanoparticles using magnetron sputtering method on a liquid substrate. Polypropylene glycol with three different molecular weights of 425, 1000, and 4000 was chosen as the liquid substrate. The influence of the different viscosities of these substrates on the size and morphology of the nanoparticles produced in the magnetron was investigated. Dynamic light scattering and transmission electron microscopy methods were used to determine the size of the nanoparticles. Furthermore, the catalytic activity of the produced nanoparticles in an alkaline environment was investigated using the rotating disk electrode technique.

Keywords: Nanoparticles, Magnetron Sputtering, Polypropylene glycol, Hydrogen Fuel Cells, Water Electrolyzers, Hydrogen oxidation/reduction reactions.