

Title: Study of the effect of gaseous poisons on magnetron-sputtered catalyst for hydrogen fuel cell

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Abstract: This bachelor thesis aims at studying effects and processes occurring on the surface of different PtRu catalysts for hydrogen fuel cells in connection with gaseous poisoning by CO. For these purposes the catalytic layers containing different proportions of Pt and Ru were made on porous membranes and glassy carbon. The technology of magnetron sputtering and plasma etching were used for their preparation. The layers were studied by several techniques and the properties of the alloys with respect to CO poisoning were determined. It was shown that increasing the concentration of Ru in the PtRu catalyst leads to higher catalyst resistivity against CO poisoning. However, starting from some point the catalyst total activity in fuel cell started to decrease, indicating that there is a defined upper limit for the Ru concentration in the bimetallic catalyst equal to about 50% in the alloy. The results of this work clearly indicate the high potential of magnetron sputtered PtRu catalysts in fuel cell applications.

Keywords: fuel cell, hydrogen, catalysts poisoning