

Title: Study of CeO_x / Rh inverse catalyst

Author: Bc. Miroslav Kettner

Department: Department of Surface and Plasma Science

Supervisor: doc. RNDr. Václav Nežasil, Dr., Department of Surface and Plasma Science

Abstract: Inverse catalysts of cerium oxide deposited on polycrystalline and monocrystalline (111) rhodium substrates were studied by means of surface science experimental methods. Growth characteristics of cerium oxide were investigated in dependence on deposition conditions and different thickness determination methods were compared. According to oxidizing or reducing exposition conditions changes in degree of oxidation of CeO_x were observed. Further spectra analysis showed additional Ce-Rh alloy formation. Adsorption positions CO on-top and CO hollow on Rh (111) surface were differentiated by spectra fitting procedures. Oxygen absorption and reverse desorption in CeO_x was confirmed. Performed experiments indicate that this process occurs through oxide-metal interface. CO oxidation reaction mechanisms at room temperature were proposed. Cerium oxide presence is necessary for reaction occurrence. Significant influence of deposited CeO_x on proposed CO oxidation reaction mechanisms was proved by this way.

Keywords: Rhodium, cerium oxide, alloy, inverse catalyst, CO oxidation.