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PROTON EXCHANGE MEMBRANE FUEL CELL CATALYST: SYNTHESIS AND CHARACTERIZATION

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ABSTRACT

Fuel cells are a promising technology to deal with energy sustainability, especially for mobility purposes the Proton Exchange Membrane Fuel Cell and hydrogen produced from biomass could be coupled to overcome the amount of CO_2 emissions. In order to improve fuel cells performances the search for new electrocatalysts has a great importance in this technology the challenge for a fuel cell catalyst that is less poisoned by CO is one of the most important field in low temperature fuel cell developments that use alcohol and hydrocarbons as primary fuels. In this work PtSm, PtTb, PtDy, PtU, PtRuMo and PtRuDy systems have been synthesized by the colloid method, investigated by the following techniques: X-rays fluorescence analysis (XFA), X-rays powder diffraction (XRD), X-rays photoelectron spectroscopy (XPS), scanning electron microscopy (SEM), high resolution transmission electron microscopy (HRTEM), cyclic voltammetry (CV) and polarization curves (Exi). The results obtained in this work shows that PtRuMo is the best choice for direct methanol oxidation. For direct ethanol oxidation the higher activity was found in PtRuDy system. PtU system was investigated and showed an interesting behaviour in ethanol oxidation. After two cycles of H_2/O_2 and ethanol/O_2 the catalyst was able to reach the initial figures on hydrogen/oxygen oxidation which means that no degradation of the catalyst was indentified.