as redox activities, compared to undoped ceria. An recent was put also on the synthesis of nanomized ceria as an important factor for the preparation of highly active gold supported catalysts. The object of this study is to synthesize new gold catalysts supported on ceria and ceria-alumina non-promoted and promoted by molybdenum for complete benzene oxidation. The catalysts were characterized by means of XRD, TPR, XPS and Raman spectroscopy. High and stable catalytic activity was established in the temperature region 200-2400C. The presence of gold causes a modification in ceria structure leading to an increase of Ce3+ and oxygen vacancies formation. The differences in the activities within the temperature range 150-1800C and in the region of 100 % conversion (200-2400C) could be explained by supposing that in the LT region the electron transfer between nanomized gold and ceria particles via oxygen vacancies has a crucial role. In the HT region the oxygen mobility, provoked by the defective structure of ceria due to the presence of Al3+, becomes of prevailing importance. It was also concluded that alumina prevents the gold and ceria agglomeration, which is the main factor to avoid deactivation under extreme reaction conditions.

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Determination and fine tuning of the cerium oxidation state in cerium calixarene complexes

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Interesting structures and properties as well as perspectives of practical use motivated intensive studies of various calixarene complexes in recent years. The development of new catalysts increases also the interest in the design and synthesis of supramolecular metalocalixarene arrays. The novel cerium calixarene complexes [p-Bu-calix[4](OMe)3(O)Ce(acac)] (1) and [p-Bu-calix[4](OMe)2(O)Ce(fac)] (2) were recently synthesized in an equimolar reaction between p-Bu-calix[4](OMe)3(OH) and cerium complexes Ce(acac) (acac = acetylacetonate), and Ce(fac) (fac = 1,1,1,5,5,5-hexafluoro-acetylacetonate), respectively [1].

The cerium oxidation state in such complexes is discussed intensively, whereas contradictory results are reported [2]. In the present study, X-ray photoelectron spectroscopy (XPS) with monochromatic Al Kα excitation (1486.74 eV) was applied in a "fast transfer" mode [3]. The experiments revealed an irradiation-induced decrease of the Ce4+ values of both complexes dependent upon X-ray exposure. The detailed study of the dynamical response of the Ce 3d to X-ray irradiation allowed the determination of Ce 3d zero irradiation [3.60 for complex (1) and 3.65 for complex (2), respectively]. Neither vacuum-induced reduction, nor re-oxidation of the irradiated compounds in air were observed suggesting the possibility of the long-lasting X-ray induced tuning of Ce3+ in a range of at least 3.65 to 3.26.

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Synthesis and Electrochemical Characteristics of Highly Dispersed Platinum Nanoparticles on Different Carbon Supports for PEMFC

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Commercial XC-72 carbon black, multi-wall carbon nanotube (MWCNT), and bamboo charcoal were used as carbon supports for Pt catalyst for application in proton exchange membrane fuel cell (PEMFC). Due to the unique morphology of carbon nanotubes, there are less geometric barriers than XC-72 for deposition of Pt. Accu-