Αγγλική Περίληψη

Internal combustion engines are one of the main sources of air pollution. Significant reductions of regulated emissions have to be achieved in order to satisfy the demands of the increasingly stringent diesel emission standards. The aim of the present thesis was the synthesis of catalysts for the reduction of nitrogen oxides (NOx) and particulate soot (PM). At first, we synthesized nanoparticles of platinum embedded in a porous silicon oxide particle matrix via the Aerosol Spray Pyrolysis process (ASP), for the catalytic oxidation NO inside the Diesel Oxidation Catalyst (DOC). Furthermore, both for the selective reduction of NO with the presence of ammonia (NH_3-SCR) as well as the oxidation of soot particle in diesel particle filters, we synthesized nanofunctionalized particles of mixed cerium and zirconium oxides using the method of Self-Propagating High-Temperature Synthesis in liquid phase. Heterogeneous catalytic activity of the prepared samples was tested in a fixed bed reactor, while homogeneous catalytic activity via Thermogravimetric Analysis. Finally, crystalline structure of the samples was identified by X-ray diffraction, specific surface and pore size were measured by nitrogen adsorption technique (BET), while morphology was evaluated by scanning and transmission electron microscopy.