

Abstract

Continuous-flow synthesis of one-dimensional (1D) metal oxide nanostructures and/or their integration into hierarchical structures under nonthermal conditions is still a challenge. In this work, a nonthermal, continuous-flow approach for the preparation of γ -manganese oxide (γ -MnO₂) and cerium oxide (CeO₂) microspheres has been developed. By this technique, γ -MnO₂ materials with surface areas of 240, 98, and 87 m²/g and CeO₂ microspheres with a surface area of 1 m²/g have been fabricated successfully. Characterization of the materials was carried out using powder X-ray diffraction, infrared and inductively coupled plasma optical emission spectrometer (ICP/OES), nitrogen sorption, scanning electron microscopy, transmission electron microscopy, and thermogravimetric analysis. The synthesized materials showed good catalytic activity in the oxidation of α -methyl styrene.