

Abstract

Nano-cluster formation of Platinum (Pt) on a modified K-OMS-2 manganese oxide inorganic paper by reactive spray deposition technology (RSDT) is presented. RSDT was employed to produce a film on the inorganic K-OMS-2 paper material. The resultant Pt/K-OMS-2 composite material was characterized by routine experimental analysis; X-ray diffraction (XRD), H₂ chemisorption, scanning electron microscopy (SEM), X-ray energy dispersive spectroscopy (SEM/EDX), transmission electron microscopy (TEM), and by unique and specialized characterization techniques; X-ray 3D micro-tomography (MicroXCT), and high temperature scanning electron microscopy (HTSEM). The non-destructive characterization technique resolved the coating layer (MicroXCT), and the nature of the K-OMS-2 inorganic paper; layers of sheets that superimposed forming a stack (MicroXCT). The nanostructured coating on the inorganic paper type material is evaluated for carbon monoxide (CO) oxidation and conductivity measurements. Carbon monoxide (CO) oxidation with the functionalized Pt/K OMS-2 presented 100 % conversion to CO₂ at temperatures as low as 200 °C. In general, a simple, fast, and new deposition technique has been employed for the formation of highly homogeneous thick coating of Pt on an inorganic K OMS-2 paper. The coated material (Pt/K-OMS-2) was used in a catalytic process for environmental applications.