

Catalytic Oxidation of Toluene Using NiO Filter Supported on Carbon Fiber

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Carbon-fiber-supported NiO catalytic filters for oxidation of volatile organic compounds were prepared by electroless Ni-P plating and subsequent annealing processes. Surface structure and crystallinity of NiO film on carbon fiber could be modified by post-annealing at different temperatures (500 and 650°C). Catalytic thermal decompositions of toluene over these catalytic filters were investigated. 500°C annealed sample showed a higher catalytic reactivity toward toluene decomposition than 650°C annealed one under same conditions, despite of its lower surface area and toluene adsorption capacity. X-ray diffraction and X-ray photoelectron spectroscopy studies suggested that amorphous structures of NiO on 500°C annealed catalyst caused the higher reactivity for oxidation of toluene than that of 650°C annealed sample with a higher crystallinity.

Keywords: Volatile organic compounds, NiO, Catalytic oxidation