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EFFECTS OF CERIA CONTENT ON PHYSICOCHEMICAL AND CATALYTIC PROPERTIES OF NANOSTRUCTURED $\text{CeO}_2/\text{Al}_2\text{O}_3$ USED FOR CATALYTIC REMOVAL OF TOLUENE FROM WASTE GAS STREAMS

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Abstract

The effect of ceria content on the physicochemical properties and catalytic performance of nanostructured $\text{CeO}_2/\text{Al}_2\text{O}_3$ for removal of toluene from waste gas stream was studied. The properties of the catalysts were addressed using XRD, FESEM, BET, TPR- H_2 and FTIR techniques. XRD patterns confirmed the formation of CeO_2 with average crystallite size of 7.8-8.7 nm. FESEM images confirmed the presence of fine particles between 25.2-189.1 nm. BET results showed that nanostructured $\text{CeO}_2/\text{Al}_2\text{O}_3$ had high surface area. TPR patterns indicated more reducibility for higher ceria loadings. $\text{CeO}_2(30\%)/\text{Al}_2\text{O}_3$ showed almost the same activity as pure ceria, 100%. The synthesized catalysts showed good stability during reaction condition.

Key words: $\text{CeO}_2/\text{Al}_2\text{O}_3$, catalytic oxidation, nanostructure, volatile organic compounds, toluene

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