

## Catalytic Activity of Aluminum Impregnated Catalysts for the Degradation of Waste Polystyrene

**Authors :** J. Shah, M. Rasul Jan, Adnan

**Abstract :** Abstract— The aluminum impregnated catalysts of Al-alumina (Al-Al<sub>2</sub>O<sub>3</sub>), Al-montmorillonite (Al-Mmn) and Al-activated charcoal (Al-AC) of various percent loadings were prepared by wet impregnation method and characterized by SEM, XRD and N<sub>2</sub> adsorption/desorption (BET). The catalytic properties were investigated in the degradation of waste polystyrene (WPS). The results of catalytic degradation of Al metal, 20% Al-Al<sub>2</sub>O<sub>3</sub>, 5% Al-Mmn and 20% Al-AC were compared with each other for optimum conditions. Among the catalyst used 20% Al-Al<sub>2</sub>O<sub>3</sub> was found the most effective catalyst. The BET surface area of 20% Al-Al<sub>2</sub>O<sub>3</sub> determined was 70.2 m<sup>2</sup>/g. The SEM data revealed the catalyst with porous structure throughout the frame work with small nanosized crystallites. The yield of liquid products with 20% Al-Al<sub>2</sub>O<sub>3</sub> (91.53 ± 2.27 wt%) was the same as compared to Al metal (91.20 ± 0.35 wt%) but the selectivity of hydrocarbons and yield of styrene monomer (56.32 wt%) was higher with 20% Al-Al<sub>2</sub>O<sub>3</sub> catalyst.

**Keywords :** Impregnation; catalytic degradation; waste polystyrene; styrene.

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