

Ozone decomposition at room temperature over Spent Petroleum Refinery Catalyst

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In this chemical recycling process, spent petroleum refinery catalysts used had an advantage with an economical and environment aspect, due to its low cost and reuse of waste catalyst. It is well known that ozone is harmful, causing respiratory illness and enhancing photochemical pollution. In this study, the catalytic decomposition of ozone to molecular oxygen was investigated over spent fluid catalytic cracking (FCC) and naphtha reforming catalyst using a laboratory fixed-bed reactor operating isothermally at ambient pressure. Moreover, the catalysts were characterized by X-ray fluorescence and nitrogen adsorption analyses.

Experiments were performed using a flow-through reactor with spent FCC and naphtha reforming catalyst, ozone inlet concentration is 0.921 ppm and under different ranges of relative humidity (RH: 35-85%). It is evident that, the spent naphtha reforming catalyst showed a higher catalytic activity with ozone removal efficiency of 15.02%. Ozone removal efficiencies varied by differential moisture. It is shown the removal efficiency be strongly inhibited by the increase of relative humidity whereas exhibited a negligible effect.

Keywords: Fluid catalytic cracking, Naphtha reforming catalyst, Spent petroleum refinery catalysts, Ozone Decomposition