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ARUPONG WOONSAYUCA : NITROGEN OXIDE-HYDROGEN REACTION ON THE CuO/Al_2O_3 CATALYST. THESIS ADVISOR : ASSO.PROF.CHAIRIT SATAYAPRASERT D.Ing., 185 pp. ISBN 974-584-956-1

The aim of this research was to investigate the reaction between nitrogen oxide and hydrogen with CuO/Al_2O_3 as the catalyst. The reaction was carried out in the differential reactor with the range of temperature of 200-400 ^{0}C. The products were subsequently analyzed by TCD gas chromatography and the results were calculated through the method of Linear Regression to obtain the rate equation.

The results revealed that the highest conversion of nitrogen oxide could be obtained by the use of 10% CuO/Al_2O_3 by weight compared to 8% and 12% of the same catalyst. To eliminate the effect of resistance of mass and heat transfer on the rate of the reaction, the minimum flow rate was set at 135.7501 $cm^3\ min^{-1}$ with the catalyst weight of 0.1 gm and the maximum particle size of the catalyst of 337.5×10^{-6} m. For non-catalytic reaction, the maximum conversion of nitrogen oxide and the rate of the reaction were shown to be 0.42 and 0.30×10^{-3} mole of NO per hour respectively. When the reaction was progressively catalyzed with CuO/Al_2O_3 for the period of 7 hours, it was found that the conversion of nitrogen oxide decreased by 4.21%. The orders of the rate of the reaction with respect to the concentration of nitrogen oxide and hydrogen were 1.71 and 1.09 respectively, thus the overall order being 2.80. The frequency factor was 1.05×10^{18} and the activation energy was 4.48 kjoule per mole. When the experimental results were compared with the proposed rate equation, the maximum error was found to be 9.74%.