

**Title :** Alkali Treatment and Plasma - Catalytic Testing of NiO/ZSM-5 Catalyst: Effect of NaOH Concentration

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**Cooperative Education** (กรณี นำเสนอผลงานสหกิจศึกษา)

## ABSTRACT

This research is an investigation on alkali treatment and plasma-catalytic CO<sub>2</sub> conversion of NiO/ZSM-5 catalyst at different NaOH concentrations (0.05, 0.2 and 0.5 M). Commercial ZSM-5 zeolite in pellet form was alkali-treated at 75°C for 3 hour. NiO/ZSM-5 catalyst was prepared by wet impregnation method, with using 2M Ni(NO<sub>3</sub>)<sub>2</sub> aqueous solution. The prepared catalysts were characterized by Surface Area & Pore Analyzer using BET method and Scanning Electron Microscope–Energy Dispersive Spectrometer (SEM-EDS). It found that BET surface area significantly decreased while average pore size obviously increased when NaOH concentration increased. From morphology analysis by SEM, the more porous surface of ZSM-5 was observed at higher NaOH concentration. For EDS analysis, Ni content of NiO/alkali-treated ZSM-5 at 0.05, 0.2 and 0.5 M NaOH was approximately 8, 14 and 30%wt., respectively. The activity of NiO/alkali-treated ZSM-5 catalyst was further tested for CO<sub>2</sub> conversion under low-temperature plasma condition. The product gas was analyzed by Gas Chromatograph (GC). The preliminary result showed that CO<sub>2</sub> in feed could convert to be CO product.

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