ABSTRACT

PRELIMINARY STUDY ON PREPARATION AND CHARACTERIZATION OF $Ni_xCu_yFe_{(1-x-y)}O_{3\pm\delta}$ NANOCATALYSTS AND ACTIVITY TEST FOR CONVERSION OF CO_2 AND H_2 INTO ALCOHOL

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Climate change as a result of global warming is happening lately increasingly alarming and unavoidable. This is caused by increasing concentrations of greenhouse gases (GHG) in the earth's upper atmosphere. One of the efforts to tackle greenhouse gases is through conversion, especially conversion of CO2 gas which is the main component of the largest in greenhouse gases. One method of converting CO2 gas that has been developed is the catalytic hydrogenation to produce alcohol. The conversion method is done with the help of a catalyst. In this research, preparation nanokatalis $Ni_yFe_{(1-x-y)}Cu_xO_{3\pm\delta}$ (dimana x = 0,1 - 0,4) by sol-gel method, and its catalytic activity test against conversion reaction (CO_2 + H_2) to alcohol at a temperature 100^o C – 400^o C. Acid content analysis using gravimetric method indicated that $Ni_{0.2}Cu_{0.4}Fe_{0.4}O_4$ nanocatalyst has the highest acidity of 30,75 mmole pyridine/g.catatlyst. FTIR analysis demosntrated that Lewis acid sites is more dominant than BrØnsted – Lowry acid sites in the three nanocatalysts investigated. Surface marphology analysis showed that $Ni_yCu_xFe_{(1-x-y)}O_4$ nanocatalysts are not completely homogeneous, with particle sizes ranging between ±85. Conversion experiments indicated that all three catalysts prepared are active to convert CO_2 with hydrogen into ethanol and selective in the temperature range investigated, with the highest ethanol produced is 90 ppm.

Keywords : Nanocatalyst, CO_2/H_2 Conversion, Lewis and Brønsted-Lowry Acid