Khemmachat Sriboonkham 2014: Synthesis of Copper-Nickel/SBA-15 from Rice Husk Ash (RHA) Catalyst for Dimethyl Carbonate Production by Using Methanol and Carbon Dioxide. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Paisan Kongkachuichay, Ph.D. 111 pages.

The aim of this research is to synthesize the mesoporous SBA-15 supported Cu-Ni bimetallic catalyst for direct synthesis of Dimethyl Carbonate (DMC) from Methanol (CH_3OH) and Carbon Dioxide (CO_2). The SBA-15 was synthesized, using Rice Husk Ash (RHA) as a silica sources and Pluronic P123 as a directing agent via a Sol–Gel process. And Cu-Ni bimetal was loaded on the support by incipient wetness impregnation method. The mesoporous SBA-15 and the synthesized Cu-Ni/50RSBA were characterized by using X-Ray Diffraction (XRD), Nitrogen Adsorption/Desorption, Energy Dispersive X-Ray Spectrometer (EDS), X-ray Absorption Near Edge Structure (XANES) and Temperature Programmed Reduction (TPR). The results reveal that the morphology of SBA-15 prepared from 50% Rice Husk Ash (50RSBA) consists of curve-rod like silicas and well-ordered hexagonal array of mesopores. The catalytic activities were evaluated in a continuous packed bed reactor by the DMC production under the reaction conditions of temperature of 110 °C and pressure of 1.2 MPa. The results showed that the catalyst with bimetal loading of 5 wt% (5% Cu-Ni/50RSBA) exhibited the highest catalytic activities with the methanol conversion and DMC yield were 26.7 % and 4.30 % at 0.5 gram of catalyst. Moreover, the Molybdenum modified catalyst (5%Cu-Ni/2.5%Mo-50RSBA) showed greater beneficial effects on the stabilization and dispersion of copper and nickel on the catalyst support and improved the DMC yield to 5.04 % at 0.5 gram of catalyst.

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