Narathorn Sukwises 2007: Oxidative Coupling of Methane to C_2-hydrocarbon on Na_2WO_4-Mn/SiO_2, RHA, or Mullite Supports. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Ms. Pinsuda Viravathana, Ph.D. 113 pages.

The 5 wt% Na_2WO_4 -2 wt% Mn supported on various supports were prepared by incipient wetness impregnation method for the oxidative coupling of methane (OCM) reaction in a fixed-bed quartz reactor. The synthesis catalysts had three types of supports, Na_2WO_4-Mn/SiO_2, Na_2WO_4-Mn/RHA and Na_2WO_4-Mn/mullite. These catalysts were characterized by XRD, XPS and BET method of nitrogen adsorption-desorption. The XRD pattern indicated that the main crystal phases of metal oxide catalysts on supported silica powder and rice husk ash were Mn_2O_3 and Na_2WO_4, and the one on supported mullite was $MnWO_4$. From the XPS spectra of Na_2WO_4-Mn/SiO_2, Na_2WO_4-Mn/RHA, and Na_2WO_4-Mn/mullite, the results revealed the information on Na, W and Mn species distributed on the catalyst surface. The specific surface area of the supports and the prepared catalysts were investigated. For catalytic activity testing, Na_2WO_4-Mn/SiO_2 powder gave the highest CH_4 conversion of approximately 61% at the temperature of 800°C in 1 hour and as high as 45% in C_2 selectivity in 3 hours. For Na_2WO_4-Mn/RHA, the highest CH_4 conversion was 39-51% with up to 52% for C_2 selectivity. For Na_2WO_4-Mn/mullite, the highest CH_4 conversion was approximately 57% and its C_2 selectivity of 23%. Although, Na_2WO_4-Mn/SiO_2 powder gave the highest CH_4 conversion and good selectivity, the catalyst was unstable for long time use. However, the supports of RHA and mullite, the results gave good CH_4 conversion but fair C_2 selectivity, its structure after 4 hours use implied that the catalysts could be reused.

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