SYNTHESIS OF A SILICA SUPPORTED BIMETALLIC OXIDE CATALYSTS FOR CO_2 METHANATION PROCESS

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AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the result of my own, unless otherwise indicated or acknowledge as reference work.

I, hereby acknowledge that I have been supplied with Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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SUPERVISOR'S CERTIFICATION

We declared that we read this thesis and in our point of view this thesis is qualified in terms of scope and quality for the purpose of awarding the Bachelor of Chemical Engineering (Environment) with Honours.

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ABSTRACT

High energy consumptions of worldwide energy resulted on the increasing demand of fossil fuels and endanger its natural reserve. High use of fossil fuels in industrial sector and transportation leading to the high concentration of CO_2 in the atmosphere cause the global warming and greenhouse effects. In this study with the aim to help preventing the problem and offer other alternatives for fossil fuels, CO_2 methanation process is the most suitable with the presence of catalysts and support. Monometallic and bimetallic catalysts with different compositions of Ni and Co using SiO_2 have been prepared using co-precipitation method. Monometallic catalysts is the 100% composition of Ni and Co itself with SiO_2 as their support, meanwhile bimetallic catalysts of NiCo with the composition of 80/20, 50/50 and 20/80, respectively. The studies of the physical and chemical properties of these five sampled catalysts done by TGA and FTIR analysis with the Ni as the main catalysts for CO_2 methanation due to its advantages and more economical for industrial purpose. From this study, it can be concluded that combination of NiCo with 80/20 composition is the most suitable for CO_2 methanation. High composition of Ni is better and Co as secondary catalysts helps to prevent the sintering and deactivation of Ni catalysts at reaction condition for CO_2 methanation with SiO_2 as their support.