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## Performance of Dealuminated Ni/ZSM-5 Catalyst in

### Dry Reforming of Methane

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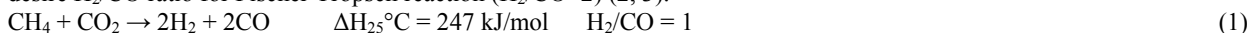
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**Abstract:** Ni/ZSM-5 modified Nano catalyst containing 3, 5 and 7wt. % Ni were prepared by impregnation method for DRM. Dealumination of ZSM-5 carried out by HNO<sub>3</sub> solution as a dealumination agent. This process led to increase Si/Al ratio for ZSM-5. For approaching to the higher conversion and H<sub>2</sub>/CO ratio, higher concentration of acid and lower temperature for treatment of ZSM-5 must be used. The sample that was prepared by higher concentration of acid and lower temperature in dealumination process, with 5%wt Ni showed a better activity and stability than unmodified sample during DRM at 700°C for 30h time on stream.

**Keywords:** Catalyst, Dry reforming, Methane, dealumination, Ni/ZSM-5

#### 1. INTRODUCTION

The process of CO<sub>2</sub> reforming of methane has received considerable attention in recent years as it constitutes a very attractive route for the production of syngas from greenhouse gases. This reaction (Eq.1) offer a potential method for reducing the concentrations of CO<sub>2</sub> emitted to the atmosphere (1) also that produce syngas (i.e. CO+H<sub>2</sub>) with H<sub>2</sub>/CO≤1 ratio, favourable for Fischer Tropsch reactions to produce liquid fuels When DRM combination with SRM for produce desire H<sub>2</sub>/CO ratio for Fischer Tropsch reaction (H<sub>2</sub>/CO=2) (2, 3).



One advantage of dry reforming of methane is produce syngas with low H<sub>2</sub>/CO ratio; and other advantage of this reaction is consuming two greenhouse gases and provide key intermediate for chemical industry. The process opens the possibility of combining steam reforming, partial oxidation, and dry reforming for the generation of syngas with a desired H<sub>2</sub>/CO ratio (4-6).

However, CO<sub>2</sub> reforming reaction is intensively endothermic, consumes a large amount of energy and produced large amount of Coke therefore the activity of catalyst has been reduced.

Besides the reforming of methane to produce syngas (Reaction 1), reverse water gas shift (Reaction 2) and several series-parallel side reactions (Reaction 3-7), have indirectly led to lower products yield and concurrently, produced water as undesirable by-product (7)

