Evaluation of Hydrogen production by Low Temperature Ethanol Steam Reforming of $Pd_{0.01}Zn_{0.29}Mg_{0.7}Al_2O_4$ spinel structure catalyst

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The development of eco-friendly new renewable energy to replace existing fossil fuels worldwide is attracting attention. One of them, steam reforming of hydrocarbon, is the research that can produce much hydrogen compared to the molar amount of reactants. It has been investigated that ethanol used as a reactant for reforming reaction is converted into hydrogen by reaction at high temperature. Recently, researches have been conducted to reduce catalyst toxicity and hydrogen production through low temperature reforming. On the other hand, Zn is one of the representative metals promoting the WGS reaction at low temperatures and is known to have an interaction with Pd, one of the noble metals widely used in the reforming reaction. In this study, MgAl2O4 catalyst was used for the ethanol reforming at low temperature, and 30% of Mg was replaced with Zn and Pd to increase the hydrogen production of the catalyst. The properties of the catalyst were analyzed by XRD, BET, TPD and tetc. In order to measure the efficiency of the catalyst, the ethanol reforming reaction was performed at 300 °C to 600 °C for 1 hour at 50 ° C, and the activity of Zn was observed at 400 to 450 °C.