

## CHAPTER VII

### CONCLUSIONS

#### 7.1 General conclusions

This research composed of three parts: 1) study the characteristic of Ni/dolomite catalyst and properties of the biomass, 2) investigate the parameters affecting the catalytic performance of Ni/dolomite catalyst 3) study the effect of some promoters loaded on Ni/dolomite catalyst. From the experiments, following conclusion can be done:

1. Nickel was supported on dolomite by precipitating method and it showed excellent catalytic activity in terms of tar reduction.
2. The calcinations temperature affected the catalyst structure and the activity of Ni/dolomite. Calcination temperature at 750 °C exhibited the most effective catalyst.
3. The high temperature favored more catalytic reforming and the high steam to carbon ratio improved the quality of the gas product. The suitable parameters were as follows; at temperature of 800°C, S/C of 0.95. These conditions produced a higher gas product composition of H<sub>2</sub> and CO and a lower CO<sub>2</sub> and CH<sub>4</sub> content.
4. The catalysts' performance was presented as a function to catalyst preparation technique. The catalysts prepared by impregnation method had a higher surface area and metallic surface than catalyst prepared by coprecipitation method. The catalyst prepared by impregnation method had a higher activity conversion to gas than coprecipitation method.
5. The addition of a small amount of noble metal group VIII such as Pt, Fe and Co enhanced the performance in the steam gasification of biomass in term of gas composition product. The Ni/Pt/DM catalyst promoted steam reforming and methane reforming and increased the H<sub>2</sub>, CO and CO<sub>2</sub> contents. The Ni/Fe/DM catalyst increased the H<sub>2</sub> and CO<sub>2</sub> production by catalyzing water-gas shift reaction. The Ni/Co/DM catalyst promoted methanation and reforming of methane which increased the CH<sub>4</sub> and CO<sub>2</sub> contents.

6. TGA showed a small amount of carbon deposited on the catalyst. The amount of the carbon deposit as a result of different catalyst is shown in the following order: Ni/Pt/DM < Ni/Fe/DM < Ni/Co/DM < Ni/DM.

## 7.2 Recommendation and suggestion

In continuation to this project, the author would like to propose that the mechanism surface be more studied with more types of the catalyst. In addition, the author would like to see further development of the bed support by synthesized dolomite using MgO, CaO solid solution.