# CHAPTER V
# CONCLUSIONS

This research has been investigated at 863-983 K on the tungsten wire in the horizontal reactor by varying the feed $CO_2/CH_4$ feed ratio in the range of 0.3-3.0. Furthermore, the activation energies of $H_2$ and CO formation were determined.

The result indicated that at 983 K $H_2/CO$ product ratio is less than 1 at various $CO_2/CH_4$ feed ratios. Due to the reverse water gas shift reaction the $H_2/CO$ product ratio decreased and water formation increased at the increased $CO_2/CH_4$ feed ratio. As the tungsten oxide occurred the carbon formation increased with increasing in $CO_2/CH_4$ feed ratio. On the other hand, the lower reaction temperature in the range of 863-983 K caused the $H_2/CO$ product ratio greater than 1 with decreasing in $H_2$ and CO production rates.

The suitable condition which enhances synthesis gas selectivity and prevents oxidation of products was considered in terms of lower $H_2/CO$ ratio, $H_2$ and CO selectivity, and $H_2$ and CO production rates. The $H_2/CO$ selectivity reached as the ratio of $CO_2/CH_4$ was unity at 983 K. In addition, the direct synthesis of methanol was not feasible by using $CO_2$ and $CH_4$. Finally, the activation energies of CO formation and $H_2$ formation obtained from the results were 56.67 and 53.77 kJ/mol respectively.