

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

Alumatrane synthesized from inexpensive and available compounds via the one step process is successfully used as an alkoxide precursor for preparing nickel loaded alumina via the sol-gel route followed by heat treatment. The samples calcined favor the formation of nickel aluminate spinel,  $\text{NiAl}_2\text{O}_4$  confirmed using XRD, FTIR, TPR and DR-UV. The calcination temperature and the nickel content affected to the crystallinity of the samples. The higher crystallinity was resulted from the higher calcination temperature and nickel content. A high Ni/Al ratio promotes the inter-diffusion of Ni(II) ions into alumina phase, and the formation of tetrahedral sites as increasing the calcinations temperature. The BET surface area measurements are found to be in the range of 300-450  $\text{m}^2/\text{g}$  at the calcination temperature of 500°C, having the pore distribution in the mesoporous region. The activity testing on CO oxidation depends on Ni to Al ratio and calcinations temperature. The higher activity was obtained from the higher Ni content and lower calcination temperature. In addition, catalysts prepared using alumatrane precursor had higher % conversion than catalysts prepared from aluminium hydroxide as a source of alumina.