

## CHAPTER V

### CONCLUSION

Mesoporous W-MCM-41 was successfully synthesized by modifying method for Mo-MCM-41 preparation reported by Cho *et al.*<sup>57</sup> Gel composition of CTMABr : 0.15(NH<sub>4</sub>)<sub>2</sub>O : 4SiO<sub>2</sub> : Na<sub>2</sub>O : xWO<sub>3</sub> : 200H<sub>2</sub>O was initially heated at 100°C for 4 days with pH adjustment of 10.2 daily.

From characterization of the W-MCM-41 samples, XRD patterns exhibit the typical hexagonal lattice corresponding to that reported by Beck<sup>16</sup> and the increasing of tungsten content results in a decrease in intensity of XRD peaks. The N<sub>2</sub> adsorption-desorption isotherms also revealed that all samples exhibit a well-expressed hysteresis loop of type IV and the specific surface area in the mesopores decreases with the increase of tungsten content due to the destruction of the pore structure. In the FT-IR spectra, the vibration band at ca. 960 cm<sup>-1</sup> is attributed to the W-O-Si linkage. Types of tungsten species depend on the loading amount in catalysts. The maximum uptake of tungsten was found for the sample prepared from the gel containing Si/W of 4 corresponding to the Si/W in the product of 84.

After impregnation with tungstate compound, XRD results confirm that MCM-41 lost its structure because the condensed tungstic oxide has an effect on the mesostructure of MCM-41.

Metathesis of 1-hexene was chosen to test catalytic activity of W-MCM-41 catalysts comparing with MCM-41 impregnated WO<sub>3</sub>/MCM-41 at the same Si/W

ratios. It is found that the isolated tungsten sites incorporated in the framework of W-MCM-41 had much greater conversion than  $\text{WO}_3$  impregnated on MCM-41 as supported catalysts at the same Si/W product ratio.

The gas product distribution was composed of ethylene, propylene and butene. Methane is formed as a by-product. The individual gas contents depends on the condition of catalysis.

**The suggestion for future work :**

- 1) Synthesizing Mo-MCM-41 for metathesis of 1-hexene and comparing catalytic activity with W-MCM-41 in the same metal content and condition.
- 2) Varying supporting materials such as zeolite, other meoporours materials for 1-hexene metathesis and comparing catalytic activity with W-MCM-41 at the same condition.
- 3) Running catalytic activity with other alkenes for example cross-metathesis of butene and ethylene.

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