

## CHAPTER IV

### CONCLUSION AND SUGGESTIONS FOR FUTURE WORK

#### 4.1 Conclusion

Hexadentate Schiff base zinc and nickel complexes have been synthesized and characterized. The chemical structures of metal complexes were identified by IR and NMR spectroscopy, elemental analysis, mass spectrometry and X-ray crystallography. Urea derivatives of these zinc complexes have been synthesized and characterized in order to obtain the information on reactivity of -NH groups in the metal complexes towards isocyanate group. Liquid crystalline property of the metal complexes and their urea derivatives have been investigated by differential scanning calorimetry. It was found that these metal complexes did not show liquid crystalline property. However, they exhibited good thermal stability. Zinc and nickel complexes were then used in the synthesis of metal-containing polyureas. The progress of polymerization reaction was investigated by IR spectroscopy. The polymers were characterized by IR and NMR spectroscopy. From the elemental analysis data, it was found that the percentage value of carbon, hydrogen and nitrogen were within the calculated value. All polymers were soluble in DMSO. The inherent viscosity of the polyureas was found to be in the range 0.1410-0.3456 dL/g. Thermal and flame retardant properties of metal-containing polyureas were investigated by using thermogravimetric analysis and measuring limit oxygen index, respectively. Among the polyureas, the MDI-based polyureas were found to be the most thermally stable with high flame retardancy.

#### 4.2 Suggestions for future work

The suggestion for future work is to synthesize Schiff base metal complexes with different amines and metal acetates. The obtained metal complexes can be used in the synthesis of various polymers such as polyureas or polyurethane-ureas. The changes in transition metal complexes and ligands should give different property of metal-containing polymers.