

CHAPTER IV

CONCLUSION AND SUGGESTIONS FOR FUTURE WORK

4.1 Conclusion

4,4'-Dihydroxysaltetraen manganese and cobalt complexes (ML_1) have been synthesized. The chemical structures of metal complexes were identified by IR spectroscopy and elemental analysis. It was found that the obtained products were the mixture of 4,4'-dihydroxysaltetraen metal complexes and ligand salt which was difficult to purify. Therefore, other metal complexes, 4,4'-dihydroxysalicyclohexane zinc and copper complexes (ML_2) have been synthesized. The chemical structures of metal complexes were identified by IR spectroscopy, 1H NMR spectroscopy, elemental analysis and mass spectrometry. The results showed that the obtained products were the mixture of ML_2 and ML_2 salt. Metal-containing polyurethanes have been synthesized by the polymerization reaction between ML_2 and different prepolymers (PB900 and PP1000) using dibutyltin dilaurate as a catalyst. Polyurethane-ureas with and without metal in the main chain were also synthesized to compare the properties with synthesized metal-containing polyurethanes. The progress of polymerization reaction was investigated by IR spectroscopy. The polymers were characterized by IR spectroscopy. All polymers were soluble in DMF and DMSO.

Thermal properties of all polymers were investigated using thermogravimetric analysis (TGA). From TGA study, it was found that PB900-based polymers showed higher thermal stability than PP1000-based polymers and the polymers having copper complex in the main chain was more thermally stable than those having zinc complex in the main chain. Furthermore, metal-containing polymers show higher thermal stability than polymers without metal in the main chain and the polymers having higher amount of metal complexes in the main chain show higher thermal stability. The highest thermal stability polymer is Cu-PB900. From TGA study, the IDT of Cu-PB900 is $263^\circ C$ and the residual weight at $800^\circ C$ of Cu-PB900 is 9.4%.

4.2 Suggestions for future work

The suggestion for future work is to synthesize metal-containing polymers from ML_2 and different diisocyanates such as MDI, HMDI and TDI. Moreover, utilization of different ligands and transition metals should give metal complexes, which result in different property of metal-containing polymers.



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