

## CHAPTER IV

### CONCLUSION

Tetradentate Schiff's base metal complexes of Co-1, Ni-1 and Cu-1 have been prepared from 2,4-dihydroxybenzaldehyde and 1,3-diaminopropane with cobalt, nickel and copper acetates. It was found that these metal complexes underwent crosslinking reaction with DGEBA to give metal-containing epoxy polymers. The order of reactivity of the complexes towards DGEBA is Co-1  $\approx$  Cu-1 > Ni-1 > Zn-1. Crosslinking reactions of DGEBA using the Co-1, Ni-1 and Cu-1 complexes are faster than conventional crosslinking agents such as 2,7-dihydroxynaphthalene and bisphenol A. Cu-containing epoxy polymers have the  $T_g$  values higher than the Co and Ni-containing epoxy polymers. When the mole ratio of metal complexes:DGEBA is 1:1.67, the metal-containing epoxy polymers have the highest  $T_g$  values. Studies of percent weight loss at different temperatures, show that Cu-containing epoxy polymers have the highest thermal stability; however, study at isothermal temperature (245 °C) shows that Ni-containing epoxy polymers have the highest thermal stability.

The reaction of Zn-1 complex and DGEBA occurs at high temperature. The maximum rate of Zn-1 complex to DGEBA occurs at 290 °C, while the highest temperature of the oven is 245 °C. It is difficult to prepare. So the Zn-containing epoxy polymer is not investigated. The mixtures of Co(1) and Cu(1) complexes with DGEBA have high viscosity at the mole ratio of 1:1. It is difficult to degass, the polymers obtained have a lot of cavity. So Co and Cu-containing epoxy polymers at the mole ratio of 1:1 is not investigated.

The crosslinking temperature of DGEBA with the metal complexes was rather high and it could be decreased by use of catalysts such as NaOH and quaternary ammonium salts.<sup>24-25</sup> This subject will be further investigated in our laboratory.