

CHAPTER IV

CONCLUSIONS

The strength of hydrogen bonding of both novolac-type phenolic resin and polybenzoxazines has been investigated by FT-IR as a function of temperature. It is found that temperature has influence on intermolecular hydrogen bonding but little effect on intramolecular hydrogen bonding. As temperature increases, the absorbance due to hydrogen bonding decreases. The break-up and reformation of hydrogen bonding are influenced by the β -transition. Both inter and intramolecular hydrogen bonds can be used in order to explain the unusual properties of polybenzoxazines. The hydrogen bonding of polybenzoxazines contribute to unavailability of hydroxyl and amine groups to interact with water molecules. The strength of hydrogen bonding contributes to the high Tg's and high moduli even at low crosslink densities. Finally, hydrogen bonding stiffer the chain leads to a higher free volume, and may contribute to the expansion in volume.