

CHAPTER IV

CONCLUSIONS

The room temperature density of the B-a benzoxazine was investigated as a function of curing time and isothermal curing temperature. A 1-2 % volumetric expansion after polymerization of B-a was found as a function of curing conditions. The greater the percent conversion, the higher the volumetric expansion. Vitrification occurred in the systems cured at temperatures lower than 170 °C which is the ultimate glass transition temperature of the cured B-a. For curing temperatures above the ultimate T_g ($T_c > T_g$), vitrification did not occur, so the reaction reached 100 % conversion. At 185 °C, minor volumetric shrinkage was observed at prolonged curing times possibly due to the different curing mechanism. From the comparison between degrees of conversion at different curing temperatures and the respective glass transition temperatures, the evolution of the T_g as a function of the fractional conversion was found to show the opposite trend to epoxy resin and thermosetting polyimide resin. In B-a benzoxazine, the main increase in T_g takes place during the early stages of polymerization. This early development of T_g is advantageous from processing point of view.