

Cure of Epoxy Resin with Mixed Catalysts.

I. DGEBA-Ethylene diamine-Xylylenediamine System

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It is important to analyze the curing kinetics for the optimum use of epoxies. In this study, the techniques of differential scanning calorimetry was employed to investigate the curing reactions of commercial diglycidyl ether of bisphenol A (DGEBA) prepolymer with the stoichiometric mixtures of aliphatic and aromatic diamines as curing agents. Ethylene diamine (EDA) and p-xylylenediamine(PXD) or m-xylylenediamine (MXD) were used as a aliphatic and aromatic curing agent respectively.

It was ultimate goal of this study to elucidate the changes of cure kinetics when the mixed curing agents were used for the curing of DGEBA, and to find the possibility whether reaction rates could be controlled by mixing two different curing agents of different reaction rates.

It was observed that the heat of reactions notably increased when the mixed curing agent of EDA and PXD was used, which indicate the increases of cross-link density. The phenomenon was also confirmed by glass transition temperatures of completely cured epoxies. It was also found that the reaction rate constants of mixed catalysts are always in-between the rate constant of component catalyst although the activation energy does not change significantly.