

Physical properties of a UV-cured epoxy film with various diluents and graphene nanoplatelets

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Cationic photopolymerization of a cycloaliphatic epoxy proceeds efficiently at room temperature. But, the highly crosslinked rigid structure of photopolymerized epoxides can lead to undesirable brittleness. Therefore, in this study, one epoxy and two polyol diluents, were used to prepare a cycloaliphatic epoxy nanocomposite film with reasonable properties by UV-curing. Also, graphene nanoplatelets(GNPs) and amine-functionalized GNPs was used as nanofillers to improve performance of the nanocomposite film. FTIR spectroscopy was used to confirm the photopolymerization kinetics of the nanocomposite system and the amine-functionalization of GNPs. Thermal and mechanical properties of the epoxy nanocomposite were investigated by TMA and UTM. All the diluents studied greatly enhanced epoxide polymerization rate and conversion levels. Gel content of the nanocomposite with the epoxy diluent was the highest among the nanocomposite films prepared in this work. All the diluents induced less brittleness and enhanced flexibility of the epoxy nanocomposite film.