

Effects of Reactive Diluent on the UV Curing behavior and Properties of an Epoxy Acrylate Resin

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UV (ultraviolet) curing behavior of an epoxy acrylate resin system comprising an epoxy acrylate oligomer, photoinitiator and reactive diluent was investigated by FTIR spectroscopy. UV curing of the epoxy acrylate resin system was carried out in a conveyor type UV curing instrument. The mechanical and thermal properties of the epoxy acrylate resin system cured were investigated using a differential scanning calorimeter (DSC), thermo mechanical analyzer (TMA), dynamic mechanical analyzer (DMA) and thermogravimetric analyzer (TGA). The photoinitiator used was 2-hydroxy-2-methyl-1-phenylpropan-1-one (Darocur 1173). Three kinds of reactive diluents, 2-hydroxy ethyl acrylate (HEA), hexanediol diacrylate (HDDA) and trimethylol propane triacrylate (TMPTA), were used respectively to modify the resin system. Fractional conversion of the epoxy acrylate resin system during polymerization was calculated from the area of the absorption peak for the vinyl group vibration occurring at 810 cm^{-1} . The glass transition temperatures of the cured epoxy acrylate resin systems of various compositions were measured by DSC, TMA and DMA respectively.