

Investigating Optical Properties of Unsaturated Polyurethane Matrix and Its Glass Fiber Composite Under Extreme Temperatures

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Abstract : Glass fiber reinforced polymers are widely used in structural systems as load-bearing elements at both high and low temperatures. This investigation presents the evaluation of glass fiber reinforced unsaturated polyurethane under harsh conditions of changing temperature and moisture content. This study Explores how these parameters affect the optical properties of the polymer matrix and the composite. Using the hand layup method, the polyurethane resin was modified by E-glass fibers (15 vol. %) to manufacture fiber-reinforced composite. This work includes the preparation of glass-like polyurethane resin sheets and estimates all light transmittance properties at high and very low temperatures and wet conditions. All-optical properties were retested to evaluate the level of improvement or failure. The results found that when comprising reinforced composite fiber to the unreinforced specimens, the reinforced composite shows a fair optical property at high temperatures and good performance at low temperatures.

Keywords : unsaturated polyurethane, extreme temperatures, light transmittance, haze number

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