142af Impact of Carbon Nanofibers on Cure Kinetics and Viscosity of Vinyl Ester Resin System

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The essential elements in the manufacturing processes of thermosetting composites are mold filling and resin cure. The important parameters required in modeling and designing mold filling are the permeability of the fibrous preform and the viscosity of the resin. To consolidate a composite, resin cure or chemical reaction plays a crucial role. Therefore, cure kinetics is necessary to quantify the extent of chemical reaction or degree of cure for the given cure cycle. It is also important to predict resin viscosity during mold filling, which may change due to chemical reaction. The cure kinetics of a vinyl ester resin system was analyzed by an autocatalytic kinetic model modified with a maximum achievable cure parameter to account for low conversions achieved during room temperature. The rheological properties of a vinyl ester resin system with varying amounts of carbon nanofibers were characterized by viscosity measurements using a Brookfield Rheometer. This paper discusses the impact of carbon nanofibers on cure kinetics and viscosity of vinyl ester resin system.