

Nanocomposites and nanomaterials

PVT analyses of cure behavior and curing state of Cyanate Ester Resins synthesized *in situ* different amino-modified nanoclays

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Cyanate Ester Resins (CER) are highly ranked thermosetting polymers combining simplicity of synthesis procedure with a number of desirable service properties of the final material [1]. However, curing of most thermosets is accompanied by considerable shrinkage caused by simultaneous processes of polymerization and crosslinking. Moreover, high shrinkage degree may reveal some difficulties in processing as well as deformation and cracks in the final material etc.

To improve mechanical characteristics of crosslinked polymers reactive modifiers, rubbers, nanofillers etc. are usually used [1, 2]. But such additives may change the cure stoichiometry and mechanism of curing, kinetics of polymer network formation, degree of conversion etc. [2]. As a result, the final morphology and properties of the material may differ considerably from the expected ones.

Therefore, the aim of this work was to study the curing behavior and chemistry of CER network formation in the presence of nanoclay containing amine modifiers reactive toward CER monomer. Using PVT method structural changes of the reaction mixture in the entire range of conversion were registered. The effect of nanoclay amount on polymerization kinetics and curing process as well as on the resulting properties of CER/clay nanocomposites was established. The difference between the PVT results obtained as compared to the individually synthesized CER as well as in the presence of the conventional complex catalyst was defined.

1. Thermostable polycyanurates: synthesis, modification, structure and properties / Ed. A. Fainleib.–New York: Nova Science Publishers Inc., 2010.–362 p.
2. Pionteck J., Müller Y., Häußler L. Reactive Epoxy-CTBN Rubber Blends: Reflection of Changed Curing Mechanism in Cure Shrinkage and Phase Separation Behaviour // *Macromol. Symp.*-2011.- **306-307**.-P. 126–140.