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Trimerization of Phenyl Cyanate Ester MADHUSUDHAN REDDY PALLAKA, SINDEE L. SIMON, Texas Tech Univ — The kinetics of phenyl cyanate ester trimerization is studied in the bulk using differential scanning calorimetry. Dynamic experiments for different heating rates are analyzed for the activation energy using the model-free Kissinger-Akahira-Sunose(KAS) isoconversion method. The activation energy and other kinetic parameters are also obtained by fitting the dynamic data to a first order autocatalytic reaction model, which well describes the experimental data. The activation energy obtained from the KAS isoconversion method (70.1 kJ/mol) is in good agreement with that obtained from the kinetic model (73.2 kJ/mol) and is much lower than the more bulky cyanate esters studied in our laboratory, which have activation energies of approximately 95 kJ/mol. In addition, the rate constant for the phenyl cyanate ester is one to two orders higher than the bulkier cyanate esters in the temperature range of 200 to 300°C. Further elucidation of the dynamic experiments revealed a strong dependence of the reaction kinetics on the sample weight. Future work aims to understand this finding.

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