TUNABLE LOW-TEMPERATURE CURE EPOXY POLYMERIZATIONS BY SUPRAMOLECULAR ARREST

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Epoxy resins have long been used as structural adhesives and in the encapsulation of microelectronics. A one-component epoxy system has been developed that utilizes supramolecular arrest to control and trigger the crosslinking. The existence of a hydrogen bonding complex is further supported by experiments performed with highly reactive monomers in the presence of cyclic polyethers. These reactions can make use of redox generated superacids to trigger the ring-opening polymerizations. The system provides a long working life before crosslinking can be triggered thermally. Rheological studies of diproplylene glycol diglycidyl ether show hours of working life at room temperature before the onset of crosslinking. The same monomer can begin crosslinking under 3 minutes at temperatures of 60 degrees Celsius. The control of reactivity and the simplicity of a one-component system are important features that promote the utility of this class of thermoset polymers.