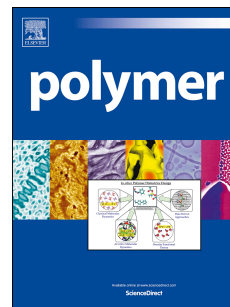


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## Examining the nature of the network formation during epoxy polymerization initiated using ionic liquids

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**ABSTRACT:** A commercial diglycidyl ether of bisphenol A monomer (Baxxores<sup>TM</sup> ER 2200,  $e_w$  182 g/mole) is thermally polymerized in the presence of an ionic liquid, 1-ethyl-3-methylimidazolium acetate at a variety of loadings (5-45 wt %). The loss modulus data for cured samples containing 5 wt % initiator display at least two thermal transitions and the highest storage modulus occurs in the sample that has been cured for the shortest time at the lowest temperature. Samples that are exposed to higher temperatures (140, 150 °C) yield more heterogenous networks, whereas following exposure to a much shorter/lower temperature cure schedule (80 °C) exhibits a considerably higher damping ability than the other samples, coupled with a lower glass transition temperature. Differential scanning calorimetry reveals that the latter sample achieves a conversion of 95 %, while crosslink densities for the DGEBA samples containing 5 wt % and 15 wt % are respectively  $9.5 \times 10^{-3} \text{ mol. dm}^{-3}$  and  $1.2 \times 10^{-3} \text{ mol. dm}^{-3}$  (when cured to 80 °C) and  $2.0 \times 10^{-2} \text{ mol. dm}^{-3}$  and  $2.4 \times 10^{-3} \text{ mol. dm}^{-3}$  (when cured to 140 °C).

**Keywords:** Epoxy Resins, Ionic Liquids, Initiators, Network formation, Physico-mechanical Properties.

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