Cure Behaviors and Mechanical Interfacial Properties of Epoxy Resins Initiated by Latent Thermal Catalysts

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In this work, the epoxy resins (DGEBA) were cured by two cationic latent thermal catalysts, i.e., N-benzylpyrazinium hexafluoroantimonate (BPH) and benzyl-2,5-dimethyl-pyrazinium hexafluoroantimonate (BDPH) to investigate the effect of substituted methyl groups of BDPH on thermal and mechanical interfacial properties of the specimens. Cure behaviors of the epoxy resins using the two catalysts were determined by dynamic differential scanning calorimetry. The mechanical interfacial properties of the cured epoxy were also characterized by critical stress intensity factor (K_{IC}). As a result, the conversion and cure activation energy of the DGEBA/BDPH system were higher than those of DGEBA/BPH system. The K_{IC} of DGEBA/BDPH system was also superior, as compared with DGEBA/BDPH system. These results were probably due to the effect of substituted methyl groups of BDPH, which was modified from BPH, resulting in increasing the crosslinking density and structural stability in the epoxy resins studied.