

Miscibility of Polybenzimidazole/Polyimidesulfone
and Related Copolymers Blends

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A series of blends of the aromatic polybenzimidazole, poly(2,2(m-phenylene)-5,5'-benzimidazole) (PBI), and the aromatic polyimidesulfone from 3,3',4,4'-benzophenone tetracarboxylic dianhydride (BTDA) and 3,3'-diaminodiphenylsulfone (3,3'DDS) (PISO) has been prepared by film casting from N,N'-dimethylacetamide (DMAc) solution mixture. The differential scanning calorimetry, dynamic mechanical analysis and FT-IR spectroscopy were adapted to clarify the miscibility of PBI/PISO blends. The blends showed the single but very broad glass transition and this transition range was up to 110 °C especially for PBI/PISO 50/50 wt % blend by DSC measurement. The DSC thermograms were spread and shifted gradually to higher temperature with increasing times of run cycle which included annealing at 400 or 420 °C without showing the phase separated transition even at last. The dynamic mechanical behavior showed the similar result with that of DSC and the evidence that the blends reacted more vigorously at above 420 °C than the pure components due to catalytic activity of benzimidazole. From FT-IR spectra, the gradual linear shift of N-H stretching band maxima as much as about 50 cm⁻¹ was shown. But the phthalimide carbonyl and sulfone stretching band maxima showed little shift.