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Effect of critical molecular weight of PEO in epoxy/EPO blends as characterized by advanced DSC and solid-state NMR XIAOLIANG WANG, Department of Polymer Science and Engineering, Nanjing University, SHOUDONG LU, PINGCHUAN SUN, College of Chemistry, Nankai University, GI XUE, Department of Polymer Science and Engineering, Nanjing University — The differential scanning calorimetry (DSC) and solid state NMR have been used to systematically study the length scale of the miscibility and local dynamics of the epoxy resin/poly(ethylene oxide) (ER/PEO) blends with different PEO molecular weight. By DSC, we found that the diffusion behavior of PEO with different Mw is an important factor in controlling these behaviors upon curing. We further employed two-dimensional ^{13}C - $\{^1\text{H}\}$ PISEMA NMR experiment to elucidate the possible weak interaction and detailed local dynamics in ER/PEO blends. The CH_2O group of PEO forms hydrogen bond with hydroxyl proton of cured-ER ether group, and its local dynamics frozen by such interaction. Our finding indicates that molecular weight (Mw) of PEO is a crucial factor in controlling the miscibility, chain dynamics and hydrogen bonding interaction in these blends.

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