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Entanglement Length in Miscible Blends of *cis*-Polyisoprene and Poly(*ptert*-butylstyrene) HIROSHI WATANABE, YUMI MATSUMIYA, Inst. Chem. Res., Kyoto Univ. — In miscible polymer blends, the entanglement length is common for the components, but its changes with the composition w remain unclear. For this problem, this study analyzed viscoelastic data for miscible blends of *cis*-polyisoprene (PI) and poly(*ptert*-butylstyrene) (PtBS), considering the basic feature that the local relaxation is determined only by w_{PI} . On the basis of this feature, a series of unentangled low- M PI/PtBS blends having various M and a given w_{PI} were utilized as references for well-entangled high- M PI/PtBS blends having the same w_{PI} , and the modulus data of the references were subtracted from the high- M blend data. For an optimally chosen reference, the storage modulus G'_e of the high- M blends obtained after the subtraction exhibited a clear entanglement plateau G'_N and the corresponding G''_e decreased in proportion to $1/\omega$ at high frequencies ω . Thus, the onset of entanglement relaxation was detected. The G'_N values were well described by a linear mixing rule of the entanglement length with the number fraction of Kuhn segments of the components being utilized as the averaging weight. This result, not explained by a mean-field picture of entanglement, is discussed in relation to local packing of bulky PtBS chains and skinny PI chains.

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