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Effect of Cross-linking History on Slow Shape Recovery of Disordered Nematic Elastomers KENJI URAYAMA, SEIJI HONDA, TOSHIKAZU TAKIGAWA, Dept. Mater. Chem., Kyoto Univ., Kyoto 615-8510, Japan — A loosely cross-linked nematic elastomer having a polydomain texture slowly recovers to their initial shape from the distorted state in the order of 1000 s after the imposed field is removed. The mesogen orientation during cross-linking greatly affects the shape recovery dynamics of polydomain nematic elastomers, whereas it has no appreciable influence on their equilibrium properties such as the nematic-isotropic transition temperature, degree of swelling, and field-induced strain. A nematic elastomer formed in the (low-temperature) polydomain nematic state exhibits considerably faster shape recovery than that originally prepared in the (high-temperature) isotropic state because of the memory effect of the initial director distribution during cross-linking. The relaxation time steeply increases as the temperature approaches the transition temperatures; this is independent of the initial mesogen alignment at the cross-linking stage.

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