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Light Scattering Investigation of Dynamic and Viscoelastic Properties of Entangled Poly(ethylene oxide) Melts in the Presence of LiClO₄

SHUFU PENG, J. C. SELSER, R. BOGOSLOVOV, G. PIET, University of Nevada Las Vegas — Laser light scattering measurements are employed to investigate the dynamics of entangled poly(ethylene oxide) with and without lithium perchlorate in melts. The single-exponential ACF relaxation mode was observed and exhibited q^2 dependence with and without salt in melts; behavior interpreted as due to the relaxation of a transient PEO network. The results of activation energy from the dynamic light scattering and viscometry measurements were compared. Static scattering measurements indicated that the structure factor exhibits a universal power law $I(q) \sim q^{-2.0 \pm 0.1}$ in the melts; which agree with the prediction of the percolation theory. Furthermore, the results revealed that the level of entanglement of PEO chains is different depending on the existence of LiClO₄.

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