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Abstract:

The rheology of an aluminum diisooctanoate (M4)-xylene gel was investigated over the temperature range of 0 to 50C, a frequency range of 0.002 to 1 Hz and at a displacement of 0.1 cm with an NWC-designed forced vibration rheometer using flat plates. The gel showed linear viscoelastic behavior over the range of measurement used here. The loss modulus exhibited an absorption peak in the region of 0.03 Hz at 50C which shifted towards lower frequencies with decreasing temperatures; it is attributed to motion of the aliphatic soap side chain. The energies of activation derived from the moduli are ascribed to side chain and main chain motions. A modification of Gray's postulated structure for the aluminum soap gel is proposed in which the aluminum-oxygen polymer backbone forms a helix which is stabilized by hydrogen bonding between the hydroxyl group and the carboxylic acid moiety. (Author)

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