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Re-examination of the slow mode in semidilute solutions CHI WU, The Chinese University of Hong Kong — Dynamics of semidilute solutions has been well described by two different motions, respectively, related to the "blobs" and the reptation of an entire chain. In the past, dynamic LLS results revealed that besides the fast relaxation related to the "blobs," there existed an additional slow relaxation. In the earlier time, such a slow mode was wrongly identified as the reptation. Later, this slow mode was attributed to possible problems in the sample preparation, such as dust particles or a concentration gradient. Whether this slow mode is real has remained a challenging problem since 80's. Recently, we found that it appears only when the solvent quality is less good. To avoid problems in the sample preparation, we, respectively, used the coil-to-globule transition of long polystyrene chains, the high-vacuum anionic polymerization of styrene in cyclohexane, and the living bulk polymerization of MMA to alternate the size of polymer chains (i.e., the overlap concentration) to induce an *in-situ* dilute-semidilute transition. Our results confirm that this slow mode is real with no ambiguity. In theory, we can demonstrate that this slow mode appears whenever segments (monomers) in different "blobs" start to interact with each other and its characteristic relaxation time is related to the correlation length of these interacting "blobs."

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