Linear and nonlinear universality in the rheology of polymer melts and solutions

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Understanding the dynamics of polymeric liquids has great importance in the design and processing of soft materials. While slow flow dynamics is now resolved, fast flow dynamics is still unsolved, especially due to the lack of experimental evidence. We here manipulate a poly(methyl methacrylate) solution into exhibiting the same flow behavior as a polystyrene melt. Strikingly similar responses of the fluids are seen both in slow and very fast flow. With this discovery we show that dynamics in polymeric liquids can be generalized and captured in one single polymer physics model.

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