Strongly non-linear extensional stress is not dominated by finite chain extensibility in polystyrene melts undergoing large steady rate extensional flows.

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Strongly non-linear extensional stress is not dominated by finite chain extensibility in polystyrene melts undergoing large steady rate extensional flows[i].

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We use small-angle neutron scattering to measure the molecular stretching in polystyrene melts undergoing steady elongational flow at large stretch rates. The radius of gyration of the central segment of a partly deuterated polystyrene molecule is, in the stretching direction, increasing with the steady stretch rate to a power of about 0.25. This value is about half of the exponent observed for the increase in stress value σ, in agreement with Gaussian behavior. Thus, finite chain extensibility does not seem to play an important role in the strongly non-linear extensional stress behavior exhibited by the linear polystyrene melt.

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[i] Ole Hassager, Kell Mortensen, Anders Bach, Kristoffer Almdal, Henrik Koblitz Rasmussen, Wim Pyckhout-Hintzen, *Rheologica Acta*, *in press.*