WHERE IS STRAIN HARDENING

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In this presentation we intend to clarify some major confusion in the field of extensional rheology of entangled polymer melts. Contrary to the conventional wisdom that any LCB polymer melts such as LDPE causes strain hardening in uniaxial extension and strain softening in shear, we show that (a) the characterization of certain rheological phenomena as "strain hardening" in the literature is inaccurate, (b) no literature data exhibit true strain hardening, (c) LCB has little to do with strain hardening, (d) true strain hardening can occur when the limit of finite chain extensibility is reached at sufficiently high rates that produce non-Gaussian chain stretching leading to rupture instead of yielding. We support our assertion using both monodisperse and bidisperse polymer melts with sufficient entanglement.