Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Foundational issues in nonlinear rheology of entangled polymeric liquids[1] SHI-QING WANG, University of Akron, POUYAN BOUKANY, SHAM RAVIDRANATH, YANGYANG WANG, XIN LI, POLYMER RHEOLOGY TEAM
— Nonlinear dynamic and mechanic responses of entangled polymeric liquids to external deformations determine processing behavior of a hundred billion pounds of thermoplastic and rubber materials that are produced every year. The emerging phenomenology and theoretical concepts suggest that we need to go beyond the conventional description of polymer rheology involving high external deformations. The new understanding emphasizes the need to monitor the deformation field without predicating that homogeneous deformation would prevail in these highly viscoelastic materials. Entangled polymeric liquids are transient soft solids with finite cohesion and necessarily have to transform from a solid-like network state to a state of flow. Apparently, this yielding often results in inhomogeneous flow. About two dozen movies of particle-tracking velocimetric observation and publications can be found at our website: http://www3.uakron.edu/rheology/

[1]Sponsored by a grant (DMR-0821697) from the National Science Foundation.

Shi-Qing Wang
University of Akron

Date submitted: 16 Nov 2009 Electronic form version 1.4