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Impact of melt-deformation on molecular structure and mechanical behavior of glassy polymers[1] JIANNING LIU, XIAOXIAO LI, ZHICHEN ZHAO, SHI-QING WANG, Department of Polymer Science, University of Akron — This work studies effects of melt deformation such as extension and compression on mechanical behavior of glassy polymers. Depending on how the entanglement network is altered during melt deformation, mechanical properties of polystyrene and poly(methyl methacrylate) are changed at temperatures below Tg. Conversely, the observed mechanical behavior below Tg reveals how molecular structures at segmental levels have undergone distortion due to melt stretching or shear. This research expands well beyond our previous investigations that have demonstrated how and why melt-stretched PS and PMMA turns ductile at room temperature....[1] and why a cold-drawn ductile polymer glass produces significant retractive stress upon annealing above the cold-drawing temperature..[2] .1.Wang, S.-Q.; Cheng, S.; Lin, P.; Li, X. A phenomenological molecular model for yielding and brittle-ductile transition of polymer glasses. *J. Chem. Phys.* **2014,** 141, (9), 094905. 2.Cheng, S.; Wang, S.-Q. Elastic Yielding after Cold Drawing of Ductile Polymer Glasses. *Macromolecules* **2014,** 47, (11), 3661-3671.

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Jianning Liu
Department of Polymer Science, University of Akron

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