

Abstract Submitted
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Characterize cohesive failure in simple shear of entangled polymer solutions on micron scales¹ POUYAN BOUKANY, OSU, SHAM RAVINDRANATH, SHI-QING WANG, University of Akron, JAMES LEE, OSU — We apply laser confocal microscopy in conjunction with a commercial rheometer to study the yielding behavior of entangled polymer solutions on length scales as low as 40 microns. The goal is to illustrate how the sample thickness dictates the overall mechanical response to sudden deformation and why the same behavior observed at conventional gap sizes (ca. 1 mm) must show up under proper conditions. Contrary to the claim of one recent study from Cornell, we show that for well-entangled polymeric liquids cohesive breakup of the entanglement network does occur for gap distance as low as 40 microns. In other words, interfacial slip alone is insufficient to take up the imposed displacement of the sample boundary.

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