Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Capillary Thinning and Pinch-off Dynamics and Printability of Polyelectrolyte Solutions VIVEK SHARMA, LEIDY N. JIMENEZ, JELENA DINIC, NIKILA PARSI, Chemical Engineering, Univ of Illinois - Chicago — Biological macromolecules like proteins, DNA and polysaccharides, and many industrial polymers, are classified together as polyelectrolytes for in solution, the repeat units in their backbone are decorated with disassociated, charge-bearing ionic groups, surrounded by counter-ions. In diverse applications like inkjet printing, sprayable cosmetics and insecticides, paints and coatings that involve formation of fluid columns or sheets that undergo progressive thinning and pinch-off into drops, the dominant flow within the necking filament is extensional in nature. The extensional rheology response of the charged macromolecular solutions is not as well understood as that of their uncharged counterparts. Here focus on the characterization of capillary thinning and pinch-off dynamics, extensional rheology and printability of two model systems: sodium (polystyrene sulfonate) and poly(acrylic acid) by using dripping-onto-substrate (DoS) rheometry technique. Both the measured extensional relaxation times and the extensional viscosity values show salt- and polymer concentration-dependent behavior that is not expected or anticipated from the typical shear rheology response.

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Date submitted: 12 Nov 2016 Electronic form version 1.4