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Capillary thinning and break-up of hydrogel-elastomer composites YINAN LIN, DARRELL RENEKER, The University of Akron — The development of a filament stretching rheometer with a high magnification and high speed digital imaging system enabled real-time video observation of the extensional behavior of the hydrogel-elastomer complex fluids. Under a motor-controlled process of tip-plate separation, ethanol solutions of polyurethane with superabsorbent particles, which can be electrospun into nanocomposite nanofibers, evolved in profile. The rapidly shrinking jet diameter was measured from video images. As in extensional rheology of homogeneous polymer solutions, the elongational viscosity and the relaxation time calculated from the time dependence of midpoint diameters define a two-dimensional operating diagram for capillary self-thinning and capillary break-up.[1]

[1]Rodd, L.E.; Scott, T.P.; Cooper-White, J.J.; McKinley, G.H. Capillary break-up rheometry of low-viscosity elastic fluids. Applied Rheology, 2005, 15(1), 12-27.

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