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Miscible displacement of a non-Newtonian fluid in a capillary tube[1] TEJASWI SOORI, THOMAS WARD, Iowa State University — This talk focuses on experiments conducted to further our understanding of how to displace an aqueous polymer within a capillary tube (diameter < 1 mm) using a Newtonian fluid. Estimates of the residual film were measured as a function of Reynolds (Re), viscous Atwood (At) and Péclet (Pé) numbers. Aqueous polymers were prepared by mixing $\phi = 0.01$–0.1% (wt/wt) Carboxymethyl Cellulose (CMC) in water. We measure the shear viscosity of the aqueous polymer over a broad range of shear rates and fit the data obtained to the Carreau fluid parameters. Separately we measure the average bulk diffusion coefficient of the aqueous polymer and water in water and aqueous polymer phases respectively. Previous studies on the immiscible displacement of polymers have shown residual film thickness to be dependent on the tube diameter. We will investigate if this is true when the two fluids are miscible in nature.

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