

607b The Role of Shear and Extensional Rheology in Film Casting

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In film casting of polymer melts the degree of necking (film width reduction) varies from polymer to polymer in no specific fashion. Here we investigate the degree of necking of two commercial metallocene polyethylenes in which one is linear while the other contains sparse long chain branching (LCB). A noticeable difference in the degree of necking as a function of processing conditions (extrusion rate and degree of drawdown) is observed. The sparsely LCB system which exhibits extensional strain-hardening in general exhibits less necking. However, this can change with extrusion rate as the branched resins exhibit a viscosity which shear thins at much lower shear rates than the linear system and high values of the primary normal stress difference. The results suggest that necking has a complex relation to the shear and extensional properties. Numerical simulation of the process using a constitutive relation which truly reflects the rheological properties will be helpful in identifying the appropriate resin and process conditions to minimize necking.