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## Modeling Elongational Viscosity of Blends of Linear and Long-chain Branched Polypropylene

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To enhance the melt strength of a conventional linear polypropylene (L-PP), blends with a long-chain branched polypropylene (LCB-PP) were produced by adding 2, 5, 10, 50, and 75 wt% of LCB-PP to L-PP and mixing in a twin screw extruder. It was found that already addition of 10% or less of LCB-PP to L-PP leads to significant strain hardening effects. Elongational viscosity data of L-PP and LCB-PP as well as of their blends were analyzed by use of the Molecular Stress Function (MSF) theory (see e.g. Wagner, Hepperle and Münstedt, *J. Rheol.* **48** (2004) 489). While melt elongational behavior of LCB-PP is characterized by the MSF parameters  $\beta=2$  (typical for LCB melts) and  $f_{\max}^2=256$  (which corresponds to a stretch of molecular chains by a factor of 16), L-PP shows very little chain stretch ( $\beta=1$ ,  $f_{\max}^2=2$ ) in uniaxial extension. To model elongational viscosity of the L-PP/LCB-PP blends, a simple second order mixing rule was developed. It allows to quantitatively predict the elongational viscosities of nearly all L-PP/LCB-PP blends on the basis of the linear and non-linear parameters of the mixing components L-PP and LCB-PP only.