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Extensional Rheology and flow-induced crystallization of polyethylene above T_m

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Polymer Solutions and Melts

TitleExtensional rheology and flow-induced crystallization of polyethylene above T_m **Presentation Date and Time**

October 10, 2017 (Tuesday) 2:20

Track / Room

Track 2 / Crystal B

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Text of Abstract

The morphology of polymeric products is highly dependent on the deformation history during processing. In processes like fiber spinning, blow moulding etc. the material undergoes extensional deformation. Due to instrumental limitations the number of studies investigating the influence of extensional flows on crystallization is very limited compared to the number of studies on shear induced crystallization. In this study we investigate the coupling between extensional flow dynamics and crystallinity of various linear polymeric systems containing some degree of ultrahigh molecular weight polyethylene (UHMwPE). It is known from shear induced crystallization studies, that the obtained morphology changes dramatically even when a very small fraction of a high molar mass component is added to the system. The fraction is so small that it is undetectable in the shear rheology [1]. The interesting aspect of investigating such systems in extension is that, inherently extensional rheology is highly sensitive to the presence of a high molar mass fraction, that also seems to govern the crystallinity. Indeed we find that the extensional response of the systems is directly correlated with the onset of crystallization as well as the final morphology. [1] Seki et al. *Macromolecules*. 35 (7) , 2583 (2002).