ELONGATIONAL FLOW PROPERTIES OF LONG-CHAIN BRANCHED POLY(ETHYLENE TEREPHTHALATE)

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ABSTRACT

It is well-known that long-chain branches (LCB) significantly influence the rheological properties of polymers in shear and elongation. In particular, the LCB structure leads to the so-called strain hardening effect in the case of uniaxial deformation of the polymer melt. This enables an improved homogeneity of thickness e.g. for blown films of low-density polyethylene or thermoformed polypropylene beakers.[1] While there exist several investigations for the isothermal elongational behavior of polyolefins, less information can be found about poly(ethylene therephthalate) (PET) melts. The main reasons for that are the inherently low melt viscosity and the linear molecule topography of PET, which complicate the measurements of the elongational properties. One successful way to increase the melt viscosity is reactive processing with low molar mass chemicals.[2]

In this contribution a commercial PET grade is reactively processed with a low molar mass modifier of different concentrations in order to create LCB structures and to enhance the melt viscosity. For the first time isothermal elongational properties of a branched PET melt, which demonstrate a pronounced strain hardening behavior, are shown. The flow properties are discussed with respect to the molecular structure and the branching level.

References:

[1]Münstedt, H., Kurzbeck, S., Stange, *Macromol. Symp*. **2006**, 245, 181.
[2]Incarnato, L., Scarfato, P., Di Maio, L., Acierno, D., *Polymer*, **2000**, 41, 6825.