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Extrudate Swell under the Effect of Radial Flow and Intrinsic Factors to the Polymer Upstream of the Die

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Abstract : The influence of both intrinsic factors, elastic energy and memory effect, and radial flow on the appearance and the evolution of the extrudate swelling are investigated in the present work. The experiments have been performed with linear polydimethylsiloxane (PDMS) via a capillary rheometer in which a convergent radial flow was created upstream the contraction. The correspondence between the effects of radial flow, entry elastic stored energy and memory effect is discussed. In particular, as the influence of the considered radial flow, extrudate photographs showed that when the gap ratio is reduced, the extrudate swell is lessened than what it is when radial flow geometry is not installed. Moreover, with a narrower gap, the polymer stores less energy during its passage through the die which implies a lower extrudate swelling at the outlet of the die. Results previously mentioned may be related both to shear and elongational components of radial flow.

Keywords : elastic energy, extrudate swell, memory effect, radial flow
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