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Relationship between Interfacial Instabilities and Mechanical Strength of Multilayer Symmetric Polymer Melts

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Abstract : In this research, an experimental apparatus has been developed for observing interfacial stability and deformation of multilayer pressure-driven channel flows. The interface instability of the co-extrusion flow of polyethylene and polypropylene is studied experimentally in a slit geometry. By investigating the growing interfacial wave (IW) and tensile stress of extrudate samples, a relationship between interfacial instability (II) and mechanical properties of polypropylene (PP) and high-density polyethylene (HDPE) has been established. It is shown that the mechanism of interfacial strength is related to interfacial instabilities as well as interfacial strength. It is shown that there is an ability to forecast the quality of final products in the co-extrusion process. In this study, it is found that the instability is controlled by its dominant wave number, which is associated with maximum tensile stress at the interface.

Keywords : interfacial instability, interfacial strength, wave number, interfacial wave
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