RHEOLOGY OF SHORT FIBER REINFORCED POLYMERS

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Plastics are increasingly replacing conventional materials, mainly due to their low production costs and their lower density. In many applications, fibers are added to improve their mechanical properties and hence their competitiveness with metallic materials. Moreover, conventional equipment (such as extruders and injection machines) can continue to be used to produce the final parts using these materials. The mechanical properties of the produced parts depend strongly on the process itself, on the rheological properties of the filled polymer and on the orientation of fibers during processing. In this work, a study of shear and extensional viscosities of composite materials containing Wollastonite fibers is performed using the Paar Physica and the CaBER$_{T\ M}$ rheometers. The Wollastonite fiber is ideally suited to many different types of industrial applications, such as ceramics, construction products, metallurgy, plastics, friction materials paintings, coating and other end-use aplications. Its vast array of applications suggests potential usage in various fields of work, but there is not much data available in the literature.
Two suspensions containing the same fiber, in a Newtonian polybutene/kerosene and in a viscoelastic fluid are investigated. The results obtained show that both types of suspensions exhibit similar viscosities when subjected to shear flows. However, when exposed to extensional flows, clearly an increase of the filament break up time is observed, due to an increase of the extensional viscosity.