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# INVESTIGATION OF THERMORHEOLOGICAL BEHAVIOR AND TRANSIENT EXTENSIONAL VISCOSITY OF COMMERCIAL LDPES

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Rheology is a sensitive tool for characterization of long chain branching (LCB) in polyolefins. Linear and non-linear rheological properties are complementary tools for investigation of LCB structures. Different reaction conditions lead to various molecular structures in commercial LDPEs. Typically LDPE has a hyper-branched structure but the level of branching is different from one to another. This work presents the experimental data of three commercial LDPEs in small amplitude oscillatory shear between 130 and 190$^{o}$C. Thermorheological behavior of these materials is investigated using time-temperature superposition and Van Gurp-Palmen Plots. Transient extensional viscosities of these samples are obtained by the SER (Sentmanat Extensioanl Rheometer) fixture. Finally the validity of molecular stress function (MSF) theory for these LDPEs is inspected and a thorough discussion of nonlinear parameters $f_{max}$ and $\beta$ of MSF theory is presented. It is found that $f_{max}$ depends on extensional rate whereas $\beta$ is a structural parameter representing the branching architecture.