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Thermo-mechanical Degradation of Philips and Ziegler-Natta Polyethylene During Processing in an Internal Mixer

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The thermo-mechanical degradation of two types of polyethylene, Philips and Ziegler-Natta, with different vinyl chain ends concentration was studied during processing in an internal mixing chamber. The variation of the melt viscosity (torque vs. time curves) is an indication of the level of chain scission and branching produced during the processing. The availability of oxygen was also considered working in partially and totally filled chambers. The torque curves and the Chain Scission and Branching Distribution Function CSBDF show that the degradation mechanism is mainly via chain branching when vinyl end groups and oxygen are present during the thermo-mechanical degradation. On the other hand chain scission is the preferred degradation mechanism when the level of vinyl end groups in the initial polymer chains and the availability of oxygen are reduced.