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The Crystallization of Syndiotactic Polystyrene from the Melt. An Overall Description of the Polymorphic Behaviour

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Crystallization from the melt of Syndiotactic Polystyrene (sPS) gives either α -crystalline form or β -form depending on the solidification conditions.

The objective of this work is to provide a complete description of the crystallization behaviour of sPS. To this purpose; the material was subjected to a very wide range of crystallization conditions, and the results can be summarized as follow: when the cooling rate is sufficiently high, α -form is obtained; whereas, the β -form is obtained when the cooling rate is lower or when the crystallization takes place under high pressure.

On the basis of the collected information, the kinetics of crystallization is described by a modified Kolmogoroff-Avrami-Evans equation in which the dependency of the kinetic constants of each phases upon temperature follows the Hoffman-Lauritzen equation. Pressure effects were kept into account by introducing dependence of T_g and T_m of each crystalline phase upon pressure. Results show a good agreement between experimental data and model prediction in the whole range of processing conditions investigated.