

# Analysis of non-isothermal crystallization during cooling and reorganization during heating of isotactic polypropylene by fast scanning DSC

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Crystallization, reorganization and melting of isotactic polypropylene (iPP) were analyzed by fast scanning DSC. The cooling and subsequent heating DSC curves are measured at scanning rates between 0.1 K/s and 30,000 K/s. We studied the formation of mesophase and  $\alpha$ -phase during cooling. Using subsequent heating measurements the kinetics of reorganization was analyzed.

The Illers-plot is used to identify reorganization effects in the heating rate dependence of the melting peak. Stable crystals follow almost a square root rule. In contrast, the melting temperature decreases linearly with the increase of the logarithm of the heating rate if reorganization occurs.

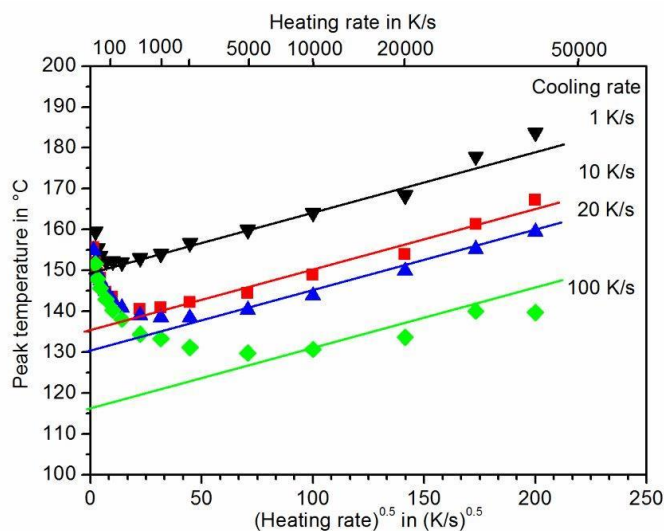


Figure 1: Illers-plot of the melting peaks of iPP. The sample was previously cooled at 1, 10, 20 and 100 K/s.

The final melting process is influenced by reorganization if the heating rate is not sufficiently higher than the previous cooling rate. Using this technique the melting temperature of the mesophase is determined to about 86 °C.

Reference:

Jürgen E.K. Schawe, *Thermochimica Acta* 603 (2015) 85–93