# The Effect of Self-Poisoning on Crystal Morphology and Growth Rates

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## Abstract

Recent extensive experimental work and the limited theoretical studies of the phenomenon of self-poisoning of the crystal growth face are reviewed. The effect arises from incorrect but nearly stable stem attachments which obstruct productive growth. Experimental data on the temperature and concentration dependence of growth rates and the morphology of long-chain monodisperse *n*-alkanes from C162H326 to C390H782 are surveyed and compared to some previously established data on poly (ethylene oxide) fractions, as well as on polyethylene. The anomalous growth rate minima in both temperature and concentration dependence of growth rates are accompanied by profound changes in crystal habits, which have been analysed in terms of growth rates on different crystallographic faces, and in terms of separate rates of step nucleation and propagation. In some cases non-nucleated rough-surface growth is approached. The phenomena covered include “poisoning” minima induced by guest species, the “dilution wave” effect, autocatalytic crystallization, pre-ordering in solution, two-dimensional nucleation, and the kinetic roughening and tilt of basal surfaces.

**Keywords** Polymer crystallization · Nucleation · Long alkanes · Surface roughness · Curved faces