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This Week's Citation Classic

Blundell D J, Keller A & Kovacs A J. A new self-nucleation phenomenon and its application to the growing of polymer crystals from solution. *J. Polym. Sci. Polym. Lett. Ed.* **4**:481-6, 1966.
[H.H. Wills Physics Lab., Univ. Bristol, England and Centre de Recherches sur les Macromole'cules, Strasbourg, France]

If a suspension of polymer in solvent is heated to a controlled temperature just above the clearing point, a minute fraction of polymer remains undissolved. On cooling, the undissolved parts act as seeds to nucleate a large number of crystals of identical size and habit. [The *SCI*® indicates that this paper has been cited over 105 times since 1966.]

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"The work originated while I was on an exchange visit to Strasbourg between October and December 1964. The plan for the exchange had been dreamed up between my research supervisor, Andrew Keller at Bristol University in England, and André Kovacs, who was working at the Centre de Recherches sur les Macromolécules in Strasbourg, France. Both of my colleagues are eminent in the field of polymer science and both incidentally are Hungarian by birth.

"Thus for three months I was 'swapped' with a fellow student, Bernard Lotz, from Strasbourg. In both our cases the idea was to blend Bristol's expertise in growing polymer crystals and in the study of the resulting morphologies with Strasbourg's expertise in precision dilatometry with its ability to follow crystallisation rates quantitatively.

"My particular task at Strasbourg was not concerned with crystal nucleation but was to measure volume changes during crystallisation in order to elucidate the nature of disorder in polymer structure. The anomalously high crystallisation rate which led to the discovery of the nucleation phenomenon was due to an accident, and as far as I can remember was the result of my immersing my dilatometer in the wrong oil bath. Clearly we probably would not have discovered the phenomenon had I not been confused by the large number of Kovac's homemade, but precisely controlled, thermostat baths.

"Having identified the crystal nucleation effect during the exchange visit, work related to the topic continued to flourish at both centres. This later research was partly aimed at elucidating the nature of the seeds that were nucleating the crystal growth. The remainder was not specifically directed to the seeds themselves but utilised the seeding phenomenon as a method for controlled crystal growth. Much of this related work would not have been possible without the self-seeding method.

"It is probably this latter aspect of controlled crystal growth that has caused the work to be so widely cited. Most materials scientists know only too well that successful research often rests on preparing suitable samples — sometimes entirely so! Without the seeding effect, a whole spectrum of crystal habits are formed ranging from large complex multilayer structures to simple monolayers. The virtue of the self-seeding method is that it provides macroscopic quantities of identical monolayer crystals with a prescribed size and habit, where any one crystal is fully representative of the whole batch.

"In the early stages of the evolution of the work we were involved in a semantic problem as to whether to refer to the technique as self-nucleation or self-seeding. This was soon resolved in favour of the latter, but, in the rush of enthusiasm to publish the first article, somehow the former term became overlooked in the title. However, subsequent papers always used the term self-seeding and it is by this term that the technique is generally known."