

2<sup>nd</sup> International Conference and Exhibition on

# POLYMER CHEMISTRY

November 15-17, 2017 | San Antonio, USA

## Epitaxial-induced polymer crystallization: Mechanism and application in multistructure control

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The multiscale morphologies of the polymeric materials in the condensed state exhibit pronounced influences on the mechanical and physical properties of the polymers. For crystalline polymers, the crystalline structure and crystal orientation provide another most important key factor in regulating the property and/or even functionality of a polymer. Therefore, the study on the crystallization of semicrystalline polymers under various conditions is an everlasting research topic. The crystallization of polymers is generally divided into two stages, i.e. nucleation and crystal growth. The nucleation can take place homogeneously or heterogeneously when it is induced by the presence of heterogeneities. Crystallization of polymers on foreign surfaces provides a typical example of heterogeneous nucleation. The study on crystal growth of polymers on oriented substrate with unique crystallographic interaction is of particular interest from both practical and scientific points of view. It is now well documented that the existence of a foreign surface can alter the crystallization kinetics, as well as the resultant crystal structure and morphology of a polymer. Figure 1 presents an example of the oriented iPP induced unique cross-hatched PE structure, in which the molecular chains of both polymers 50° apart from each other. This provides an efficient way for fabricating special structure with desired property or/and functionality of the polymeric materials. We here provide context as to how the crystal growth of polymers on oriented substrate and the influence of the substrate on the crystallization process and the resultant unique crystal structure and morphology of polymers. The advantages of surface-induced polymer crystallization to fabricate polymeric materials with improved property or enhanced efficiency will be described with some examples.

### Biography

Shouke Yan is Professor in the College of Material Sciences and Engineering at Beijing University of Chemical Technology (BUCT) in Beijing. He has completed his MS in Polymer Science at the Changchun Institute of Applied Chemistry, the Chinese Academy of Sciences (CIAC-CAS). He has earned his PhD in Polymer Science at the CIAC-CAS under the joint guidance of Prof. Decai Yang and Prof. J Petermann (Dortmund University, Germany) through a sandwich program between the CAS and the Max-Planck-Society. He then took a position on the research staff at Dortmund University. In 2002, he has returned to China through the Hundred Talents Program to become full Professor at the Institute of Chemistry, the Chinese Academy of Sciences (ICCAS). He has been recognized with several honors, including the Excellent Hundred Talents Award and an NSFC Outstanding Youth Fund. His current research involves surface-induced polymer crystallization, orientation-induced polymer crystallization and phase transition of crystalline polymers

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