

**FLUCTUATION INDUCED  
CRYSTALLIZATION:  
IN A SIMULTANEOUSLY PHASE  
SEPARATION AND CRYSTALLIZATION  
POLYOLEFIN BLEND SYSTEM**

Xiaohua Zhang, Charles C. Han

*State Key Laboratory of Polymer Physics and Chemistry,  
Joint Laboratory of Polymer Science and Materials,  
Institute of Chemistry, Chinese Academy of Sciences,  
Beijing 100080, China*

The correlation between liquid-liquid phase separation (LLPS) and crystallization at several compositions in statistical copolymer blends of poly (ethylene-co-hexene) (PEH) and poly (ethylene-co-butene) (PEB) has been examined by optical microscopy (OM), atomic force microscopy (AFM) and differential scanning calorimetry (DSC). The phase contrast optical microscopy (PCOM) showed an interconnected bicontinuous structure during LLPS, characteristic of a spinodal decomposition. In this case, the LLPS is coupled with the other ordering process, i.e. crystallization. The overwhelming change in the crystallization kinetics due to the composition fluctuation caused by the spontaneous spinodal LLPS is observed. This coupling mechanism suggests a new mechanism in the nucleation-crystallization process.

Some fine structures inside the PEB-rich phase of the macroscopically phase-separated bi-continuous domains in the 'late-stage' of LLPS is observed. Although the driving force for the formation of the fine structure needs to be investigated further, phase separated structures within a phase separated structure is obviously the main factor for these type of structure formation.