

Cold Crystallization of Poly (Ether Ether Ketone)/Graphene Composites by Time-Resolved Synchrotron X-Ray Diffraction

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Abstract : Since graphene was discovered in 2004, has been considered as superb material, due to its outstanding mechanical, electrical and thermal properties. Graphene has been incorporated as reinforcement in several high performance polymers in order to obtain a good balance of properties and to get new properties as thermal or electric conductivity. As well known, the properties of semicrystalline polymer and its composites depends heavily on degree of crystallinity. In this context, our research group has studied the crystallization behavior from amorphous state of PEEK/GNP composites. The monitoring of cold crystallization processes studied by time-resolved simultaneous wide-angle X-ray scattering (WAXS) and small-angle X-ray scattering (SAXS). These techniques allowed to get an extremely relevant information about the evolution of the morphology of the PEEK/GNP composites. In addition, the thermal evolution of cold crystallization was followed by differential scanning calorimetry (DSC) as well. The experimental results showed changes in crystallization kinetics and c parameter unit cell when adding graphene. The main aim of this work is to produce PEEK/GNP composites and characterize their morphology, unit cell parameters and crystallization kinetic.

Keywords : PEEK, graphene, synchrotron, cold crystallization

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