Morphological Development during Crystallization of Random Poly(glycolide) Copolymers: Poly(glycolide-co-lactide) and Poly(glycolide-co-caprolactone)	X27C

Z. G. Wang, B. S. Hsiao, X. H. Zong, F. Yeh (SUNY Stony Brook), and J.Zhou (Ethicon)

Morphological development of poly(glycolide), PGA, random copolymers:poly(glycolide-co-lactide) (5:95), poly(glycolide-co-lactide) (90:10) and poly(glycolide-co-caprolactone) (75:25) during isothermal crystallization was studied by synchrotron small-angle x-ray scattering (SAXS) and wide-angle x-ray diffraction (WAXD) techniques. It was found that the lamellar morphology can be best used to describe these polymers upon crystallization. In copolymers, the average long period (L) and lamellar thickness (lc) exhibit a notable decrease, which can be explained by the lamellar stacks insertion model. Crystallization rate is fast for the copolymers with high content of PGA. Homopolymer PGA has the lowest values of long period and lamellar thickness, which increase slightly with temperature. These values of PGA random copolymers increase obviously, especially at high temperature. The values of amorphous layer thickness of PGA, PGA-co-PLA (90:10) and PGA-co-PCL (75:25) are close. The higher values and their obvious increase with temperature were observed for copolymer PGA-co-PLA (5:95). WAXD data show the highest degree of crystallinity in copolymer PGA-co-PLA (5:95), the lowest and very close degrees of crystallinity in homopolymer PGA and copolymer PGA-co-PCL (75:25) and middle values in copolymer PGA-co-PLA (90:10). With the WAXD and SAXS data in hand, the correction of assignment of lager value l1 as the lamellar thickness, lc, can be proved.