

Synthesis and Characterization of CBABC Type PLGA-PEO-PPO-PEO-PLGA Pentablock Copolymers

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Based on the macro initiators of Pluronic[®] F68((EO)₇₅(PO)₃₀(EO)₇₅) and F108((EO)₁₄₁(PO)₅₄(EO)₁₄₁) triblock copolymers having PEO-PPO-PEO blocks, Poly(lactic-co-glycolic acid) (PLGA) were attached to both ends to synthesize a PLGA-PEO-PPO-PEO-PLGA pentablock copolymers. Ratio of PLGA blocks were controlled and six kinds of pentablock copolymers with different PLGA block lengths were synthesized using Stannous octoate (Sn(Oct)₂) catalyst for ring opening reaction of Cyclic D,L- lactide and glycolide. Opened Lactide and glycolide monomers were grafted randomly on hydroxyl group present at both ends of the F68 and F108 polymers. PLGA-F68-PLGA and PLGA-F108-PLGA pentablock copolymers were characterized by ¹H-NMR and TGA. The molecular weight of the products identified by NMR was 11,000-35,000g/mol and the weight fraction of the PLGA block was 0.2-0.5. Weight fraction of PLGA blocks in pentablock copolymers also calculated by thermal decomposition analysis using TGA instrument. TGA results obtained by removing PLGA block selectively also matched with ¹H-NMR results.