Regulating Dynamics of Bio-compatible and Injectable ABA Triblock Copolymer Hydrogel by Controlling End-block Hydrophobicity

정현준, 강성은, 이상호, 최수형†
홍익대학교
(shchoi@hongik.ac.kr†)

PEO-based hydrogel, network of polyethers in water, has been widely studied in various fields such as drug delivery and tissue engineering due to high biocompatibility. Recently, direct-write 3D printing of the hydrogel requires injectable materials which can be usually achieved by dynamic bonding as a cross-linker. In this study, gel relaxation dynamics was investigated using shear- and temperature-responsive physical hydrogel formed by polyether-based ABA triblock copolymers in water. Four types of poly(ethyl glycidyl ether-co-isopropyl glycidyl ether-b-ethylene oxide-b-ethyl glycidyl ether-co-isopropyl glycidyl ether) ABA triblock copolymers were synthesized by anionic ring-opening polymerization. Monomer ratio of the end block is systematically varied, but overall molecular weight is fixed. Hydrogel was formed at lower polymer concentration and lower temperature as the end block is more hydrophobic. In addition, hydrophobicity of the end block shows significant effect on the gel relaxation dynamics, and thus injectability. These results are discussed in terms of current understanding of physically cross-linked hydrogel.