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Synthesis of PEG-rich PLGA-PEG-PLGA for the PLGA-PEG-PLGA/laponite hydrogels with thermoresponsive sol-gel transitions[1]
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— Poly (D,L-lactide-co-glycolide)-b-poly (ethylene glycol)-b-poly (D,L-lactide-co-glycolide) (PLGA-PEG-PLGA) possesses moderate biocompatibility originating from the relatively shorter PEG block in its polymeric molecule. For the maximum utilization of the highly biocompatible PEG block, the PEG block should be relatively longer, and thus the PEG/PLGA ratio, the molecular weight ratio of PEG and PLGA, should be higher. In addition, for the wider use of PLGA-PEG-PLGA in the biological fields, the aqueous PLGA-PEG-PLGA solution should transfer from sol to gel states in response to the increase in temperature. It was reported, however, through the previous researches, that the PLGA-PEG-PLGA solution with a high PEG/PLGA ratio (above 0.5) would not exhibit thermoresponsive sol-gel transitions. In this work, PLGA-PEG-PLGAs with higher PEG/PLGA ratios were synthesized and the laponite, an inorganic nanoparticle, was added to the solutions to realize the thermoresponsive sol-gel transition. It was found that the PLGA-PEG-PLGA with the high PEG/PLGA ratio of 3.0 could exhibit the thermoresponsive sol-gel transition by adding laponite at 1.25 weight percent. The physical characteristics of the gel were also studied by the dynamic mechanical analysis (DMA)

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