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Preparation of biocompatible shape-memory polymers using polycaprolactone and isosorbide based polyurethane blends for biomedical application

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In this study, biocompatible and biodegradable polyurethane (PU) and polycaprolactone (PCL) were blended to enhance shape memory and mechanical properties. PCL (M.W: 80,000) was used as a hard segment and PU synthesized from isosorbide, which is non-toxic and enzyme decomposition, was used as a soft segment. The obtained PU/PCL blends with weight ratios of (3/7), (5/5) and (7/3) were investigated for their thermal properties, mechanical properties and shape memory behavior. Thermal properties of blends were investigated using differential scanning calorimetry (DSC), thermal gravimetric analysis (TGA) and shape memory properties were measured using dynamic mechanical analysis (DMA). The biodegradation test performed at 37 °C in phosphate buffered solution showed a mass loss of 2-4% for the obtained PU/PCL blends after 6 weeks. Finally, MC3T3-E1 cells cultured on PU/PCL blends showed high biocompatibility.

Biography

Yoon-Suk Joo is currently pursuing Master's degree at Dankook University. His research interest is in polymers used as biomaterials and has biocompatible polyurethane synthesis.

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