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In Vitro Degradation Studies of a Novel Unsaturated Polyphosphoester Based Injectable Bone Repair Material

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Keywords Bone repair material; degradation; polyphosphoester

A novel unsaturated polyphosphoester (UPPE) was synthesized for use as an injectable bone repair material.¹ From the point of chemical structure, phosphoester bond in this polymer backbone can be cleaved by water and possibly enzymatic digestion under physiological conditions. In this article *in vitro* degradation property of the unsaturated polyphosphoester based crosslinked composites² formed by UPPE, crosslink reagent *N*-vinyl pyrrolidone (NVP) and β -tricalcium phosphate (β -TCP) was investigated. The results indicated that UPPE/NVP/ β -TCP crosslinked composites were degradable in phosphate buffered saline. The physical parameters (sample mass, mechanical property, etc.) changed dramatically during the initial stages of degradation and changed gradually due to the slow degradation of crosslinked polymer three dimension network after 48 h. UPPE/NVP ratios were seen to have a significant effect on the mechanical properties and mass remaining of the composites throughout 120 days *in vitro* degradation. Increasing ratio of PPF/NVP resulted in an improvement in the compressive strength and modulus of composites over this time frame. Surface of samples degraded for 120 days exhibited porous morphology, which will benefit the attachment and growth of the osteoblast cell.

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