

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Dynamic Mechanical Analysis of Hydroxyapatite Nanoparticle /Gelatin Porous Scaffolds H. GHOSSEIN, I. DRANCA, S. VYAZOVKIN, A. V. STANISHEVSKY, University of Alabama at Birmingham — Porous nanoceramic/polymer scaffolds were fabricated by a freeze-drying process from synthetic nanosized hydroxyapatite / gelatin (nanoHA/Gel) mixtures with nanoHA loading varied from 0 to 50 % by weight. The scaffolds had interconnected porosity up to 90%, pore diameter in the range of 20 – 300 micron, and pore wall thickness in the range of 3 – 10 micron. Depending on the nanoHA/Gel mixture preparation routine, the HA nanoparticles either distribute uniformly within the matrix, or form aggregates on the surface of the pore walls. Dynamic mechanical analysis (DMA) of nanoHA/Gel scaffolds revealed the bending and tensile moduli up to 500 MPa and 800 MPa, respectively, when nanoHA loading was around 30% by weight. These moduli increase by a factor of 1.6 after the cross-linking of polymer. NanoHA loading above 50 % by weight results in both moduli above 2 GPa, but the cross-linking reduces them significantly. It has been further shown that the uniform dispersion of nanoHA within the polymer matrix improves the mechanical properties of the scaffolds.

Hicham Ghossein
University of Alabama at Birmingham

Date submitted: 20 Nov 2009

Electronic form version 1.4