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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.

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