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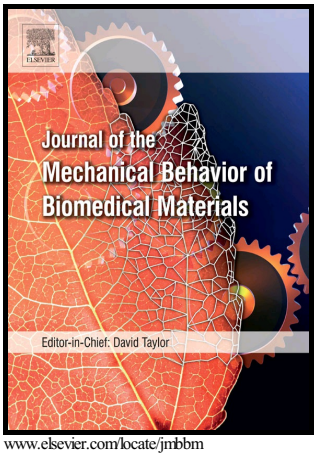

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Abstract

Porous titanium and its alloys are believed to be one of the most attractive biomaterials for orthopedic implant applications. In the present work, porous pure titanium with 50-70% porosity and different pore size was fabricated by diffusion bonding. Compression fatigue behavior was systematically studied along the out-of-plane direction. It resulted that porous pure titanium has anisotropic pore structure and the microstructure is fine-grained equiaxed α phase with a few twins in some α grains. Porosity and pore size have some effect on the S-N curve but this effect is negligible when the fatigue strength is normalized by the yield stress. The relationship between normalized fatigue strength and fatigue life conforms to a power law. The compression fatigue behavior is characteristic of strain accumulation. Porous titanium experiences uniform deformation throughout the entire sample when fatigue