A 3D hybrid auxetic lattice/foam for energy dissipation and posture comfort

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Abstract

The work describes the development of an hybrid three-dimensional composite made of a 3D auxetic lattice configuration and a layer of auxetic open cell PU foam for applications, ranging from general energy absorption/packaging to posture comfort and control for patients affected by multiple sclerosis (MS). The 3D architected lattices have been produced using 3D printing techniques, while the auxetic foam is made following a thermoforming process with controllable pressure distributions. We show here the process of design, modelling, manufacturing and testing (compression/hysteretic cycling/3P bending) of the hybrid auxetic composites, and aspects of the design involving the potential use of these structures for supports in mobility devices.

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