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PENDING

(IN202311076100) Shape memory alloy based auxetic structure for damping applications

NEED

Industrial machines, aircraft panels, and orthopedic implants suffer from repeated failures due to poor shock absorption and low flexibility. Most materials deform permanently or fatigue early. But what if structural materials expanded under stress—becoming stronger instead of weaker?

TECHNOLOGY OVERVIEW

This technology presents a shape memory alloy with a re-entrant auxetic structure, made from NiTi or FeMnSi. The auxetic geometry expands laterally under tension, enabling enhanced vibration damping, shape recovery, and fatigue resistance in dynamic environments. Ideal for aerospace, biomedical, and structural safety applications.

TECHNOLOGY KEY FEATURES

Uses NiTi or FeMnSi; exhibits auxetic behavior; laser-cut into re-entrant pattern; supports vibration damping and shape recovery; works in high-stress environments; resists fatigue better than conventional materials.

Read more here

MARKET ANALYSIS

The global shape memory alloys market is projected to grow at 10.8% CAGR, reaching $28.6B by 2033. Rising use in aerospace, automotive, and biomedical implants is driving adoption of adaptive, fatigue-resistant materials. [Sources: Precedence Research 2024, Allied Market Research]

Target Industries

Aerospace and automotive OEMs: For adaptive structural parts. Medical device developers: For smart implants and stents. Civil and mechanical engineers: For vibration-damping and stress-responsive structural elements.

AT A GLANCE

SDG 3 (Good Health and Well-being), SDG 9 (Industry, Innovation and Infrastructure), SDG 12 (Responsible Consumption and Production)

Technology is available for licensing/ co-development.

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