

Pseudoelasticity in LaNbO₄ micropillars

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Pseudoelastic materials are distinguished by their ability to undergo fully reversible stress induced phase transformations. In bulk ceramics, this effect is rarely observed due to their intrinsic brittle nature and low fracture toughness. To mitigate critical flaws such as grain boundaries and bulk defects that hinder pseudoelasticity, researchers have focused on microscale specimens, including microspheres and micropillars, which can exhibit pseudoelasticity, often accompanied by residual transformation strain. In this work, we report pronounced pseudoelastic behavior in LaNbO₄ ceramic. First, we micromachined monolithic micropillars from a densified specimen produced by spark plasma sintering. Under cyclic uniaxial compressions, these micropillar structures exhibited a remarkable pseudoelastic response with high resilience. These findings establish LaNbO₄ as a promising responsive ceramic material for durable actuator mechanisms operating in extreme environments, such as elevated temperatures and pressures, where ceramic materials performance exceeds that of conventional alloys and polymers. This behavior opens significant opportunities for applications in the automotive, energy and aerospace industries.

Professional Status of the Speaker

Doctoral or Master Student

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

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