Abstract

Magnetic Torque Driven Deformation is a mechanism to produce very large bending deformation in a magnetic material through the application of a magnetic field. Deformation strokes can be as large as the material itself, i.e. in the order of 100%. Local deformation is achieved via a displacive mechanism such as crystallographic twinning or a displacive phase transformation. To display this mechanism, the material may be ferromagnetic and possess a low stress barrier for the displacive deformation mechanism.

Boise State University has developed technology that enables very large and reversible bending deformation. Certain magnetic materials, for example magnetic shape-memory alloys, deform under very low stress via crystallography twinning. We have demonstrated this mechanism with a Ni-Mn-Ga microwire. This mechanism can be used for microactuators which allow for precise positioning of small objects, with size often in the submicron range. Micromachines also function as microactuators.

This allows Ni-Mn-Ga wires with sub-millimeter diameter, either as individual wires or as part of a 2D/3D wire assemblies, to become promising candidates for actuators, sensors, magnetic cooling systems and energy harvesting devices.

Advantages

- Large reversible bending deformation

Boise State is looking for a Licensee or development partner for this technology.

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