

Abstract

Title: Inducing Two-way Shape Memory Effect in NiTi-polymer Composite

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Abstract: Two-way shape memory effect (TWSME) allows material to actively deform between two remembered shapes without the application of external force. The most common stimulus is temperature change with several approaches to induce shape memory effect in the material. The approach studied in this thesis utilizes Nitinol and shape memory polymer. By combining these two materials, bistable TWSME was induced in the composite. Bistable TWSME allows the material to be in both of its remembered shapes at a single temperature. The shape of the material depends on the temperature profile by which the target temperature was reached. To create the composite Nitinol foil was shape set and its surface laser lined to increase adhesion with the polymer. Out of the studied polymers, the best properties for the preparation of composite were exhibited by a blend of 60 % TPU and 40 % PCL by weight. The composite was then prepared by hot press and tested.

Keywords: inducing two-way shape memory effect, Nitinol, shape memory polymer, composite