

The Shape Memory Recovery Properties under Load of a Polymer Composite

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Abstract : Shape memory polymers (SMPs) are replacing shape memory alloys (SMAs) in many applications as SMPs have certain superior properties than SMAs. However, SMAs possess some properties like recovery under stress that SMPs lack. SMPs cannot give complete recovery even under a small load. SMPs are initially heated close to their transition temperature (glass transition temperature or the melting temperature). Then force is applied to deform the heated SMP to a specific position. Subsequently, SMP is allowed to cool keeping it deformed. After cooling, SMP gets the temporary shape. This temporary shape can be recovered by heating it again at the same temperature that was given it while heating it initially. As a result, it will recover its original position. SMP can perform unconstrained recovery and constrained recovery, however; under the load, it only recovers partially. In this work, the recovery under the load of an asymmetrical shape memory composite called as CBCM-SMPC has been investigated. It is found that it has the ability to recover under different loads. Under different loads, it shows powerful complete recovery in reference to initial position. This property can be utilized in many applications.

Keywords : shape memory, polymer composite, thermo-mechanical testing, recovery under load

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