A study on shape recovery in Fe-Mn-Si shape memory alloy under cyclic thermo-compressive loading

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Shape recovery behavior in Fe-Mn-Si shape memory alloy (Fe-SMA) under tension with cyclic thermo-mechanical loading, which is also called as shape memory training process, has been clarified at various strain rate [1]. However, loading modes such as tension and compression can lead to asymmetries in the stress-strain curve, including differences in temperature change, and shape memory effect (SME) [2]. All these phenomena are associated with stress-induced martensitic transformation (SIMT) behavior. In this study, the training process of Fe-SMA under compression at different strain rate is conducted and temperature change of the specimen is measured during training process. Then, a verification process of specimens after the training process is conducted under the same condition to compare a preferred shape recovery. Finally, rate sensitivity of shape recovery is discussed with SIMT behavior.

Keywords: Shape recovery behavior; Fe-Mn-Si shape memory alloy; Rate sensitivity; Cyclic thermo-mechanical loading; Phase transformation.

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