

Supplementary data: *Influence of dynamic strain sweep on the degradation behavior of FeMnSi-Ag shape memory alloys:*

In Figure S1 are given the XRD spectra of the FeMnSi-2Ag at different temperatures (-50; 0; 25 and 100 °C) in order to confirm the presence of the main identified phases like  $\gamma$ ,  $\epsilon$  or  $\alpha'$ .

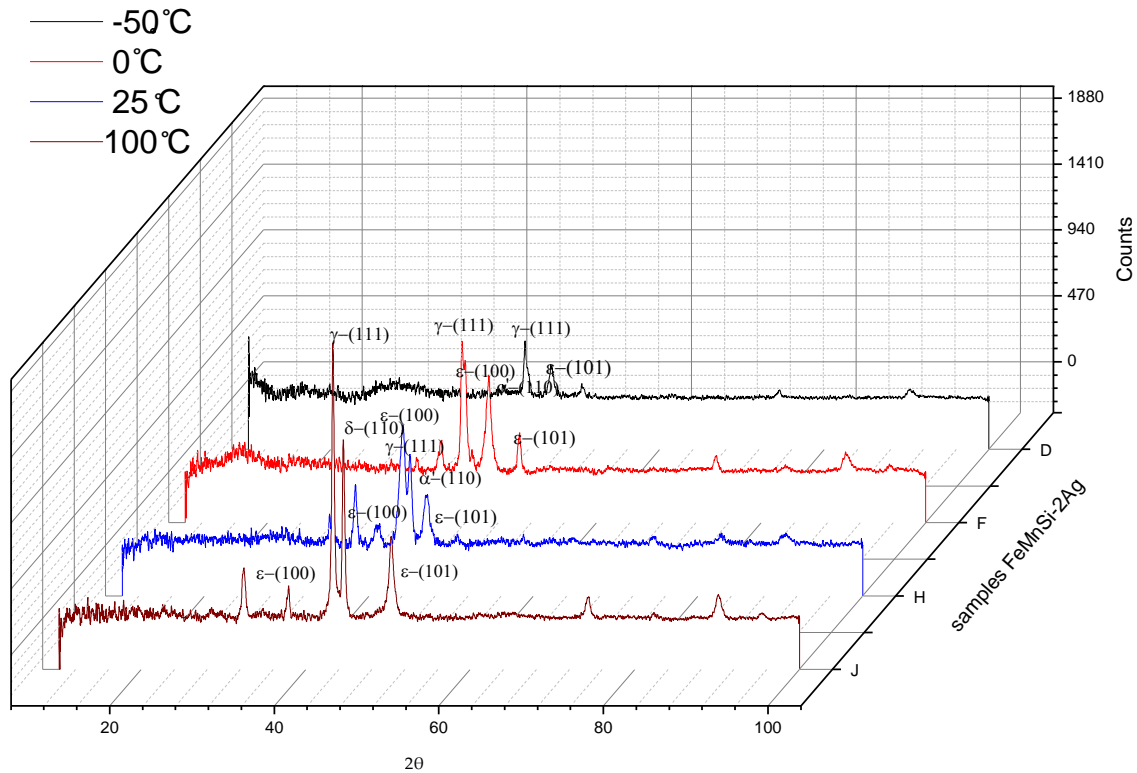


Figure S1 XRD patterns of the FeMnSi-2Ag sample -50°C, 0°C, 25°C, and 100°C

All samples analyzed are mainly austenitic phase type. The crystal structure of  $\gamma$ -austenite is face-centered-cubic (FCC), Copper-model - cF4. The cell parameter has a bigger value of the pure  $\gamma$ -Fe (0.36 nm), as preconized paying respect to the fact that this phase solid solution of Mn, Si and less Ag in Fe. Other common phases found in this system are  $\delta$ -ferrite in the sample at 25 °C and stress-induced  $\epsilon$ -martensite observed in all cases except the sample chiled down to -50 °C [59]. The  $\delta$ -ferrite phase like type crystallizes in a body centered cubic - BCC structure, W-type - Im3m. On the other hand,  $\epsilon$ -martensite exhibits hexagonal symmetry HCP, Mg-type -P63.

In this paper we focus more on the corrosion resistance and the alloy behavior in contact with Ringer solution and less on characterizing the shape memory effect of FeMnSi-

based alloys, subject extensively treated by other authors. FeMnSi-Ag lamella in hot-rolled state (relatively soft material with dimensions: 5x1x20 mm – Figure S2) after five cycles of deformation-heating steps (Figure S2) with a heating till 125 °C and cooling in water at room temperature present a partial recovery of the geometrical shape. The partial recovery of the shape was confirmed by visual tests performed by deforming (22.5 °) and heating at 125 °C temperature, only for demonstration, the but no tensile experiments were performed at this moment.

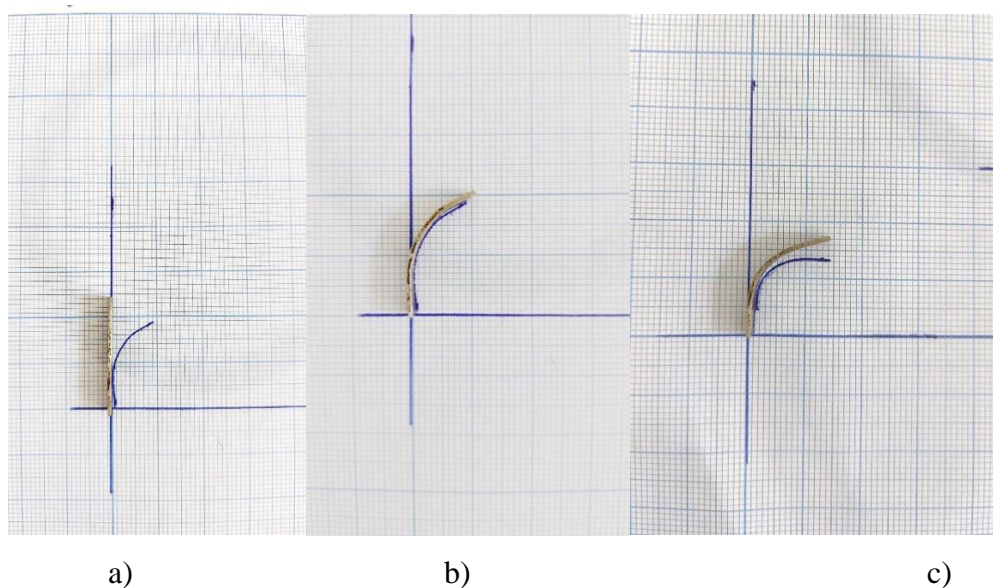


Figure S2 Partial recovery of the FeMnSi-Ag lamella after deformation and heating a) initial state, b) deformed and c) after heating

XRD results on the oxidized surface after immersion highlight the presence of  $\gamma$  and  $\epsilon$  phases on the surface alongside with iron oxides, manganese oxide iron hydroxides and carbonates, Figure S3.

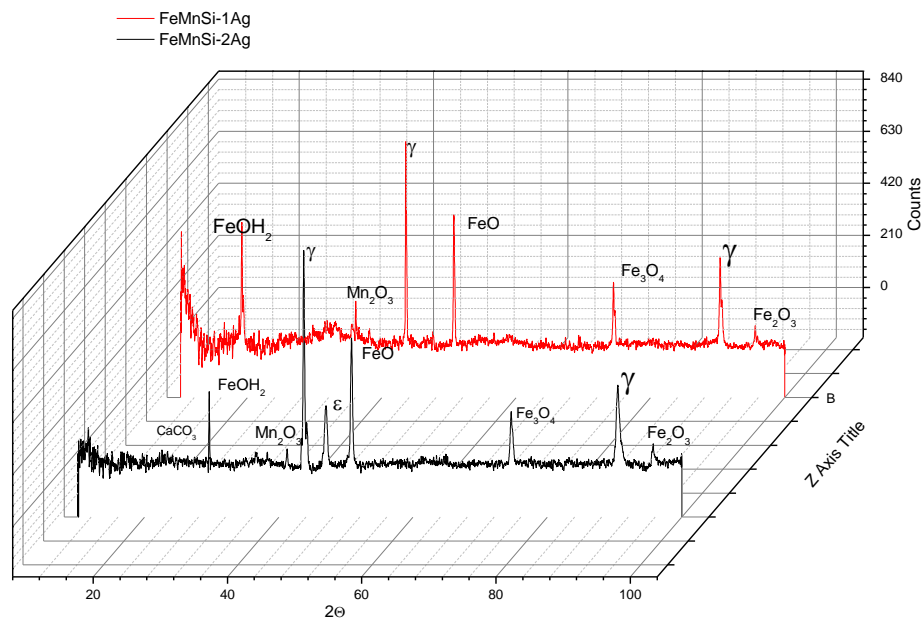


Figure S3 XRD patterns of the oxidized surface of the FeMnSi-1 (and 2) %Ag after 7 days of immersion in Ringer solution

XRD results on the oxidized surface after immersion highlight the presence of  $\gamma$  and  $\epsilon$  phases on the surface alongside with iron oxides, manganese oxide, iron hydroxides and carbonates [71], Figure S3.