Supplementary Materials (SM)

# Investigation of H sorption and corrosion properties of $Sm_2Mn_xNi_{7-x}$ ($0 \leq x < 0.5$) intermetallic compounds forming reversible hydrides

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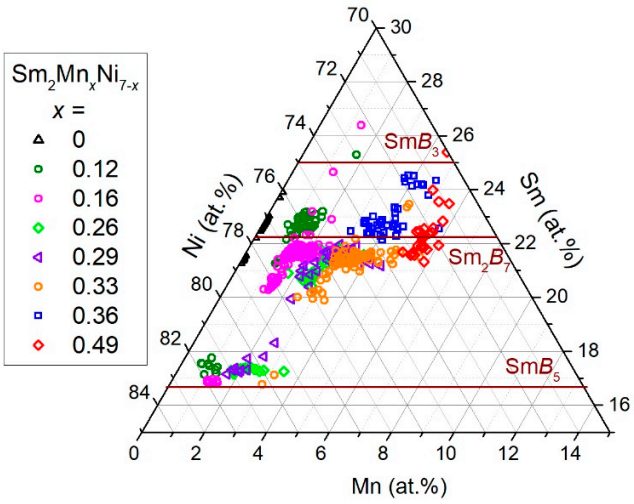


*Figure S1: Full repartition of the EPMA measurements in the Mn-Ni-Sm ternary phase diagram for $Sm_2Mn_xNi_{7-x}$ ($0 \leq x \leq 0.49$). Iso-composition lines for $SmB_5$, $Sm_2B_7$ and $SmB_3$ are shown in red in wine).*

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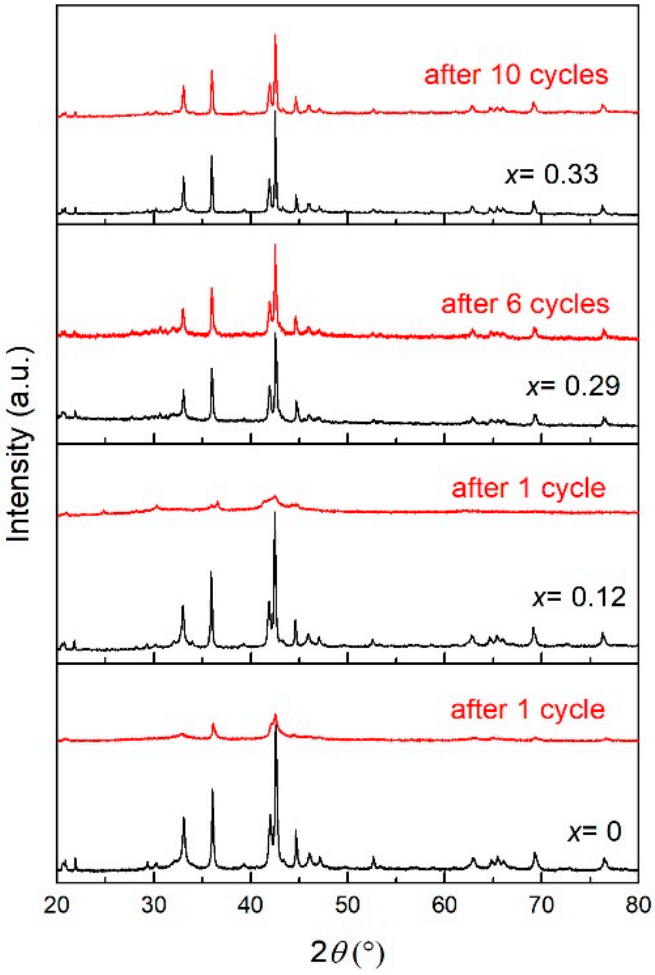


*Figure S2: Diffraction patterns of $Sm_2Mn_xNi_{7-x}$ (x = 0; 0,12; 0,29 et 0,33) for the pristine alloys (black lower curve) and after dehydrogenation under dynamic primary vacuum at 150 °C (upper red curve). Number of cycles are shown directly on the graph.*

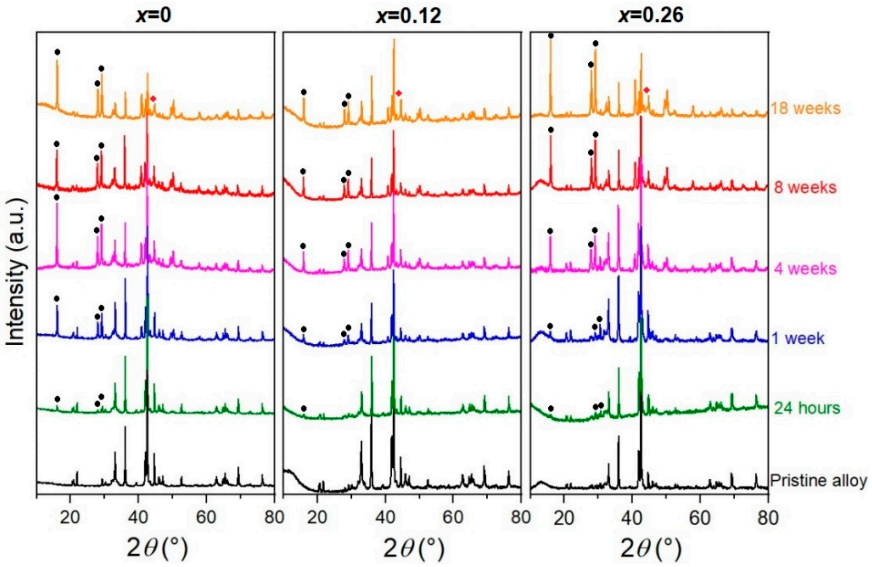


Figure S3: *Diffraction patterns for x=0 (left), x=0.12 (center) and x=0.26 (right) after different corrosion times in KOH 8.7 mol.L$^{-1}$. Formation of Sm(OH)$_3$ (black circle), and metallic nickel (red diamond) is observed upon time.*

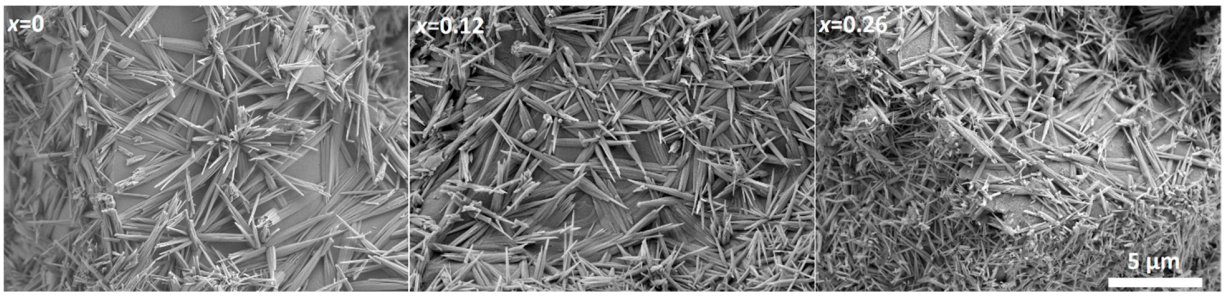


*Figure S4: SEM micrographs $Sm_2Mn_xNi_{7-x}$ after 1 week of corrosion; x= 0, 0.12 and 0.26 (left to right).*

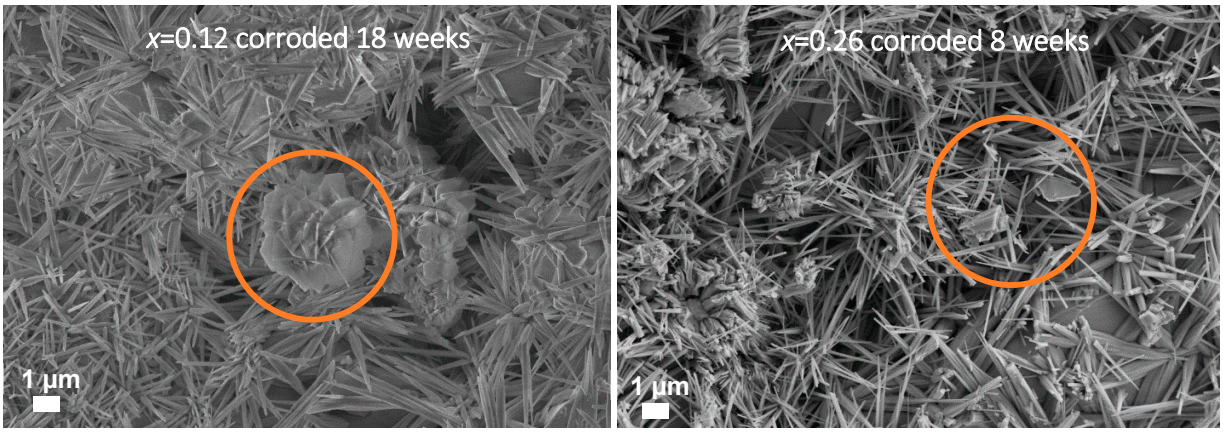


*Figure S5: Left, SEM micrograph of $Sm_2Mn_{0.12}Ni_{6.88}$ after 18 weeks of corrosion (Inlense detector), and right, $Sm_2Mn_{0.26}Ni_{6.74}$ after 8 weeks of corrosion (SE2 detector) highlighting the local presence of hexagonal shaped corrosion products (circled in orange) attributed to $Ni(OH)_2$.*

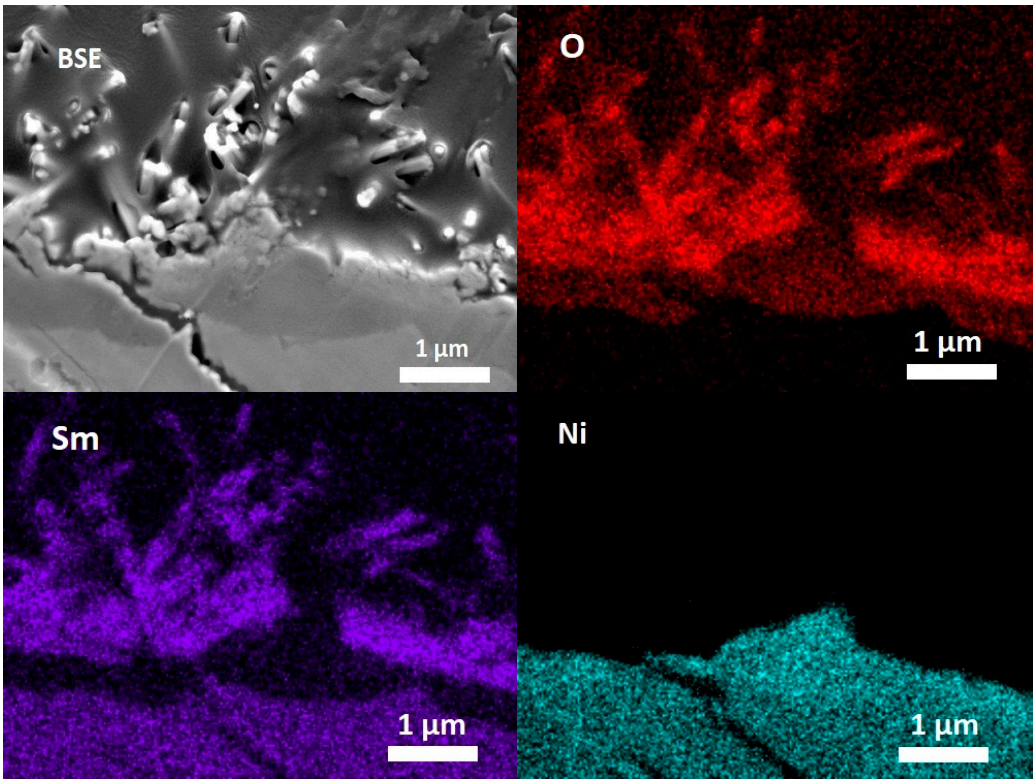


*Figure S6: SEM-BSE micrograph and EDS elemental map for O (red), Sm (purple) and Ni (cyan) of a grain cross-section of sample for x=0.26 corroded 8 weeks.*

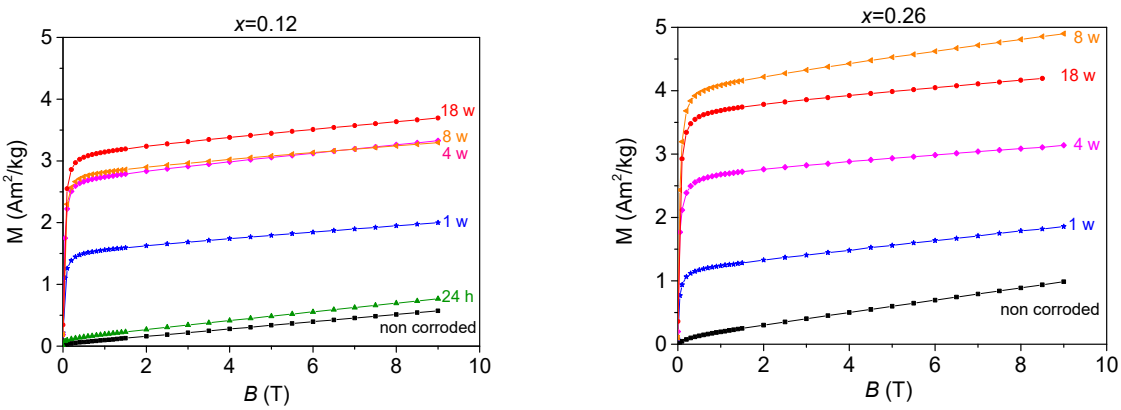


*Figure S7: Evolution of the magnetization curves (300 K) for x= 0.12 and 0.26 as a function of the field for different corrosion times (0 ≤ t ≤ 18 weeks).The curves for x=0 have been published in* [30]