Supplementary information

Defective $Sr_{0.9}Mo_{0.9}O_{3-\delta}$ perovskites with *exsolved* Ni nanoparticles as high-performance composite anodes for solid-oxide fuel cells

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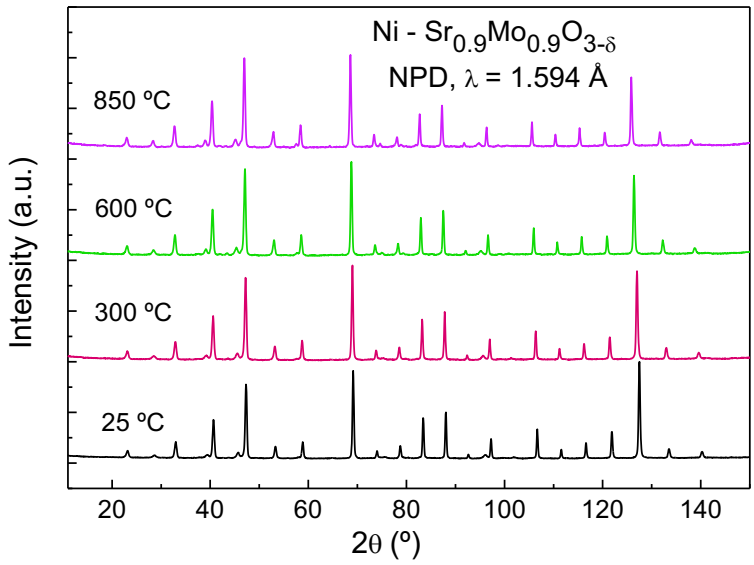


Fig. S1. Thermal evolution of the NPD patterns for Ni-$Sr_{0.90}Mo_{0.90}O_{3-\delta}$ between 25 and 850 °C. No crystallographic transitions were detected in the entire temperature range.

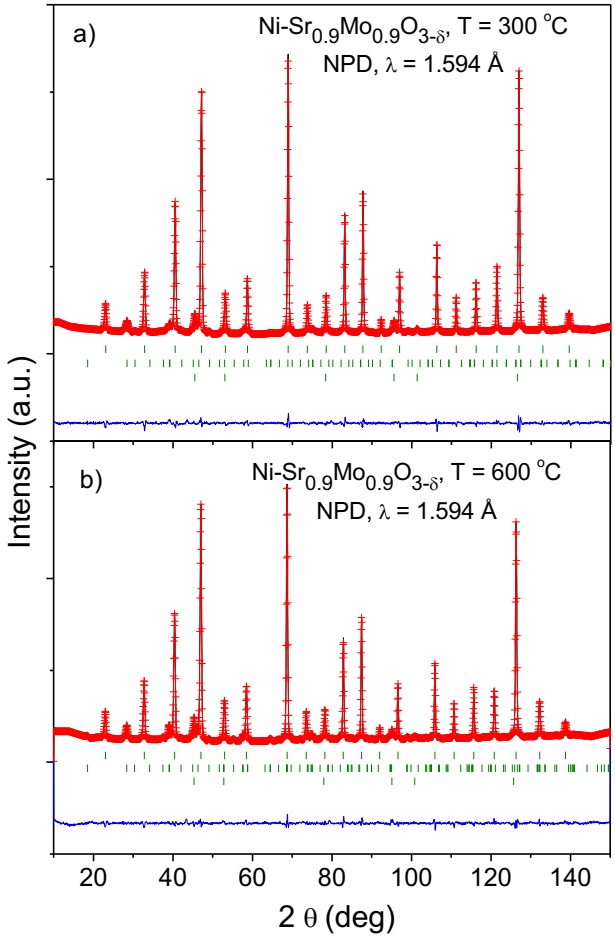
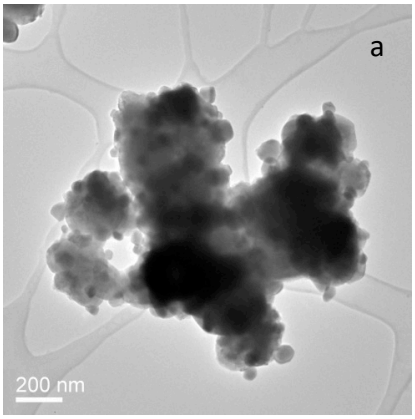
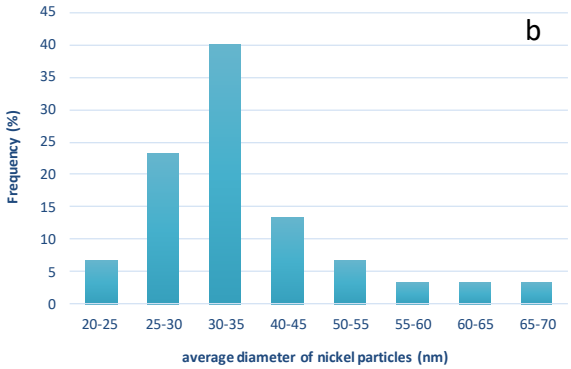
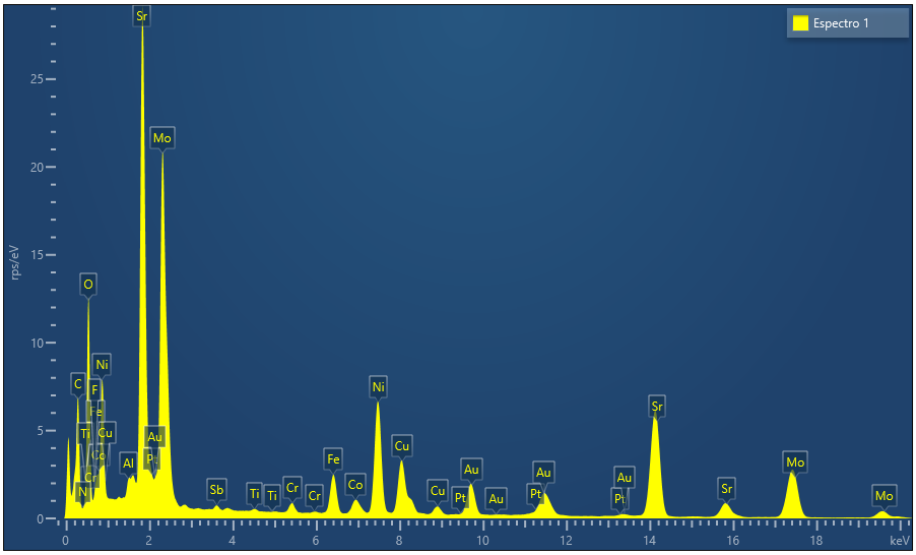


Fig. S2. Observed (red crosses), calculated (black full line) and difference (blue line) NPD profiles for the Ni-$Sr_{0.9}Mo_{0.9}O_{3-\delta}$ composite at a) 300 ºC and b) 600 °C, refined in the *Pm-3m* (No. 221) space group. A second and third set of Bragg reflections correspond to minor amounts of oxidized scheelite phase (s.g. $I4_1/a$) and exsolved metallic Ni (s.g. *Fm-3m*) respectively.







Element	Obs. (% weight)	Calc.
O	13.94	21.90
Ni	10.35	2.67
Sr	31.82	36.00
Mo	43.89	39.41
Total	100.00	100.00

Fig. S3. a) Typical particle of $Sr_{0.9}MoO_{3-\delta}$ matrix with exsolved Ni particles adhered at the surface. b) Histogram of the diameter of Ni nanoparticles in correlation with the frequency. The average size is 30-35 nm. c) EDX spectrum showing the major occurrence of Sr, Mo and Ni. The Table below indicates the % weight of Sr, Mo, Ni and O when focusing on a Ni nanoparticle; the rest of the elements are also patent.