Supplementary Materials

Characterization of Ruddlesden-Popper $La_{2-x}Ba_xNiO_{4\pm\delta}$ Nickelates as Potential Electrocatalysts for Solid Oxide Cells

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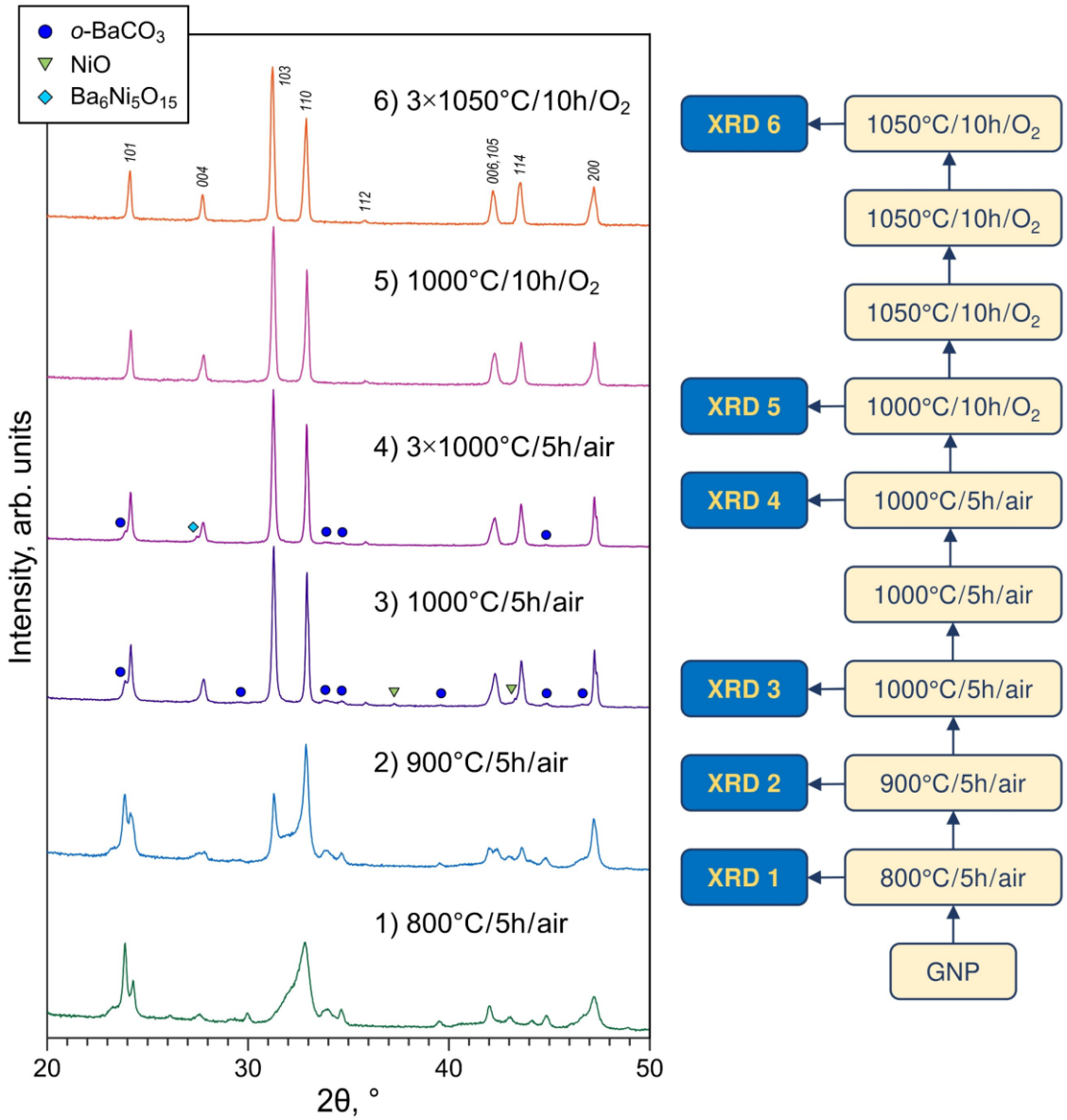


Figure S1. XRD patterns (left) showing the evolution of phase composition of $La_{1.6}Ba_{0.4}NiO_{4\pm\delta}$ ceramic powder in the course of step-wise calcinations with intermediate regrindings. The scheme (right) explains the sequence and conditions of the calcination steps. The reflections of the target phase are indexed in the *I*4/*mmm* space group. The secondary phases are marked according to ICDD PDF 04-015-3214 (orthorhombic α-$BaCO_3$), 01-089-7390 (cubic NiO), and 04-009-3992 (rhombohedral $Ba_6Ni_5O_{15}$).

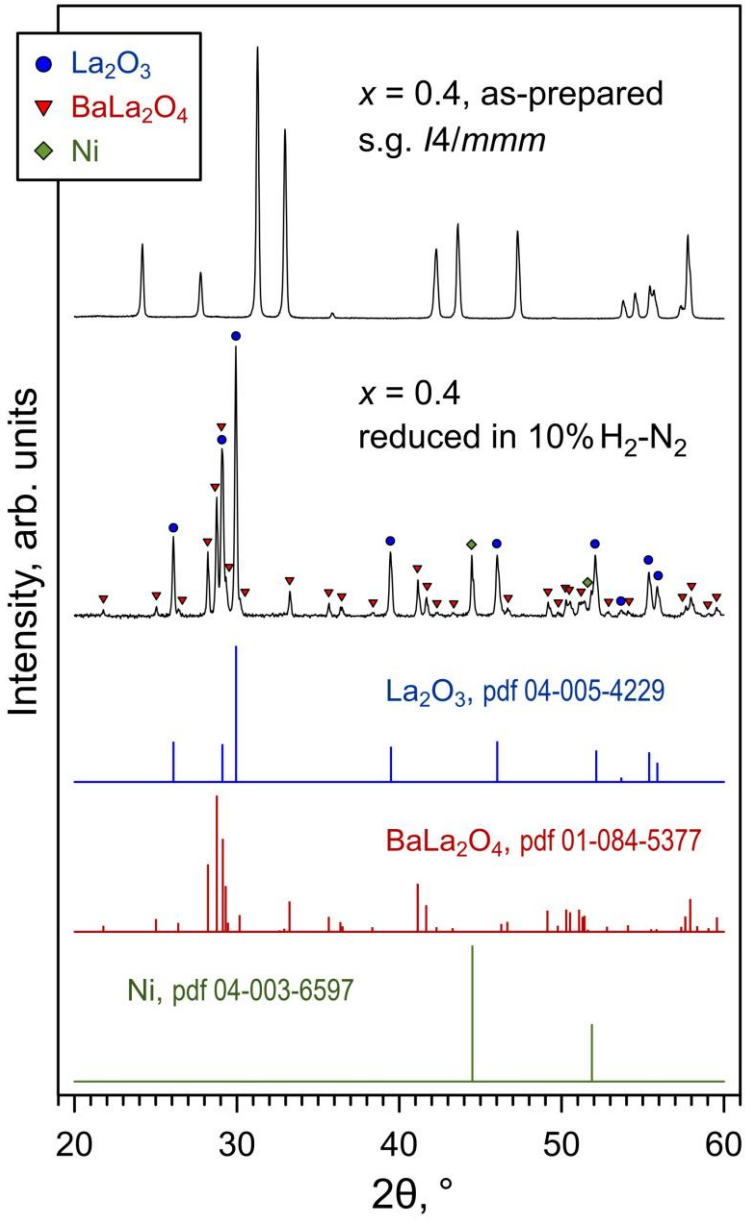


Figure S2. XRD patterns of $La_{1.6}Ba_{0.4}NiO_{4\pm\delta}$ ceramics: as-prepared and after in-situ reduction in 10% H_2-N_2 flow in thermogravimetric equipment.

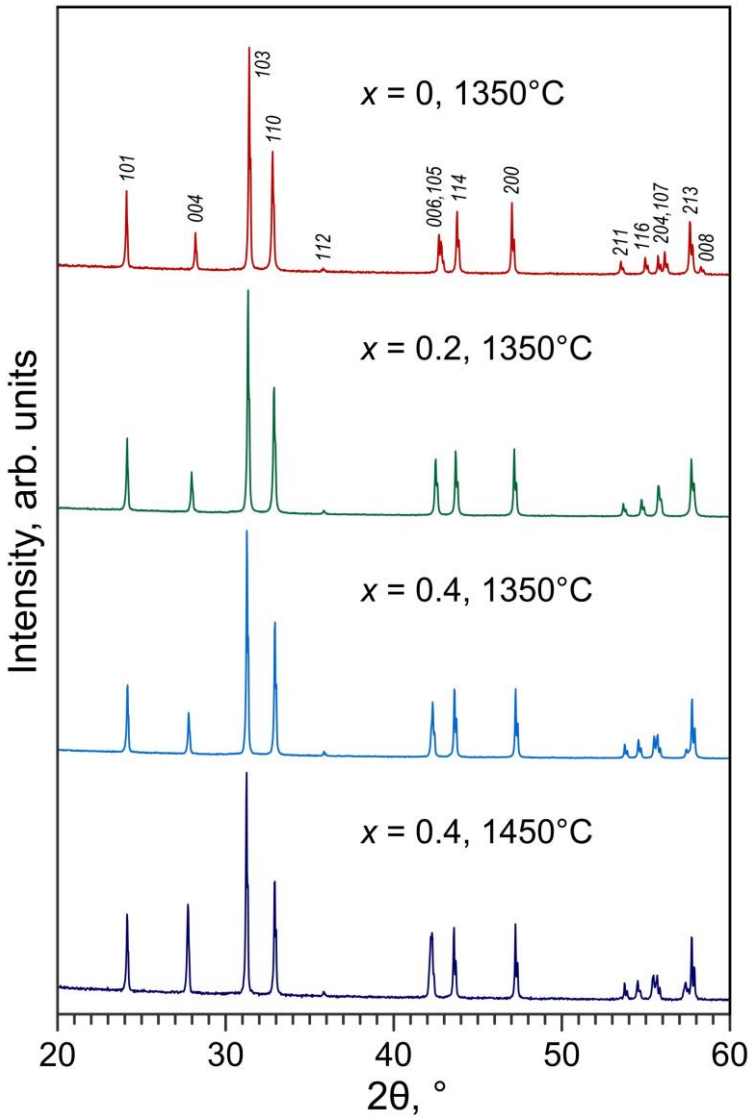


Figure S3. XRD patterns of $La_{2-x}Ba_xNiO_{4+\delta}$ (x = 0-0.4) ceramics sintered at 1350-1450 °C. The reflections are indexed in the tetragonal *I*4/*mmm* space group.

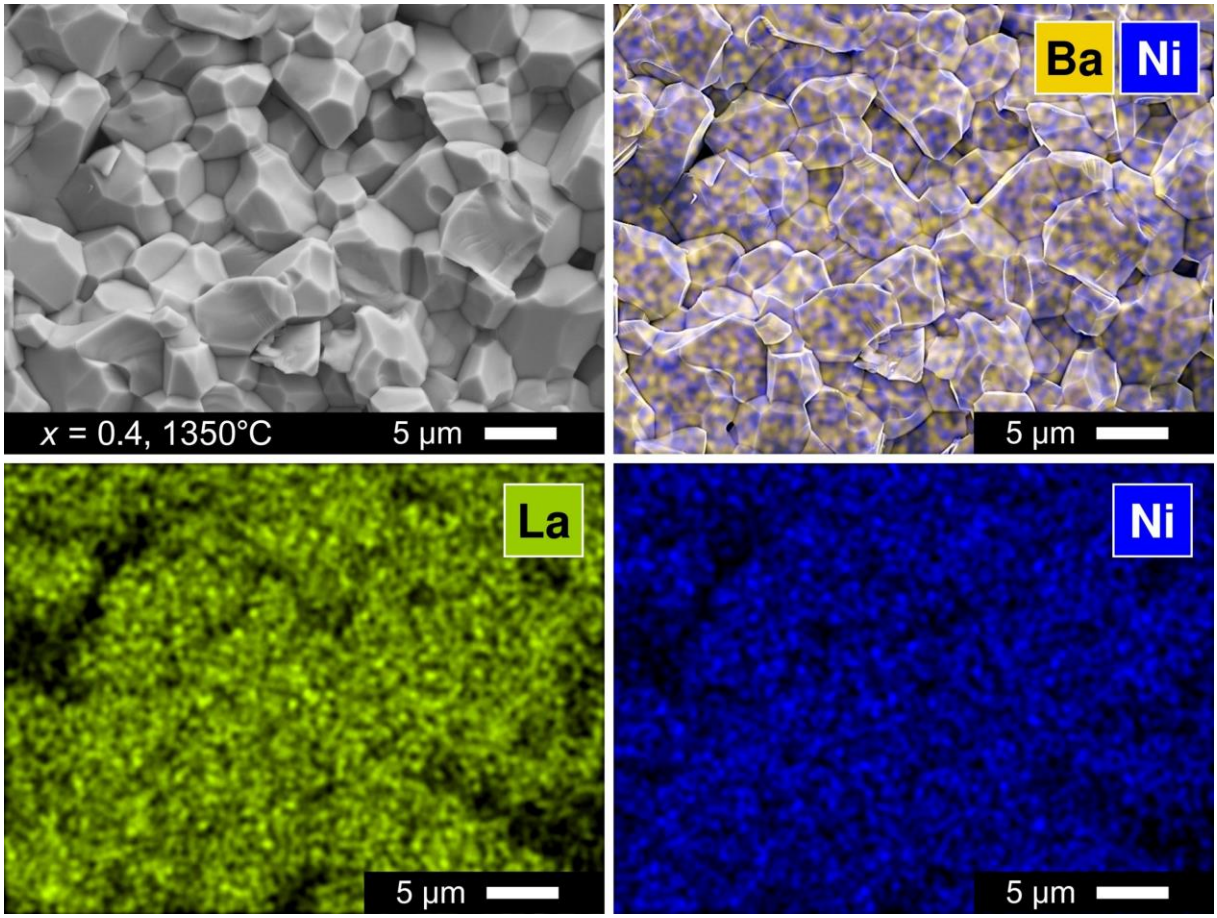


Figure S4. SEM micrograph of the fractured cross-section of $La_{1.6}Ba_{0.4}NiO_{4\pm\delta}$ ceramics sintered at 1350 °C and corresponding EDS elemental mapping results.

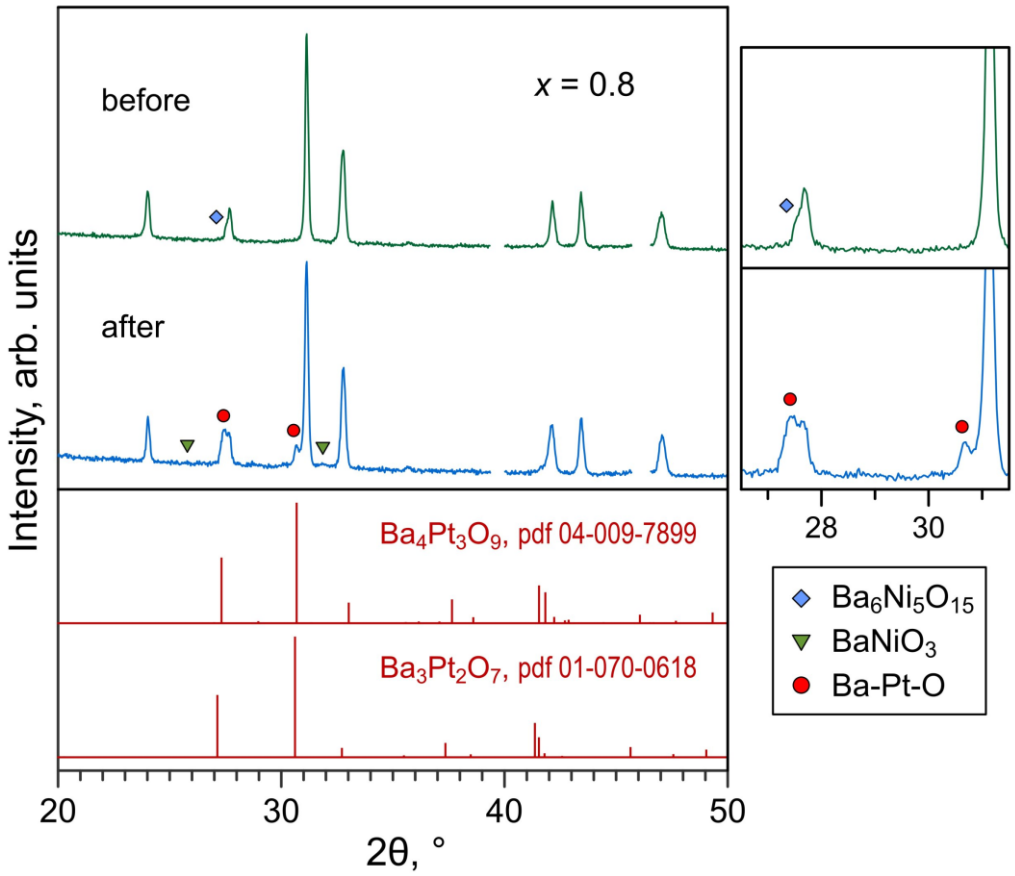


Figure S5. Room-temperature XRD patterns of $La_{1.2}Ba_{0.8}NiO_{4\pm\delta}$ ceramic sample: as-prepared (T_{sint} = 1100 °C) and after variable-temperature XRD studies at 25-1300 °C. Reflections of Pt foil support are cut out. The insets on the right demonstrate enlarged fragments of the diffractograms. The Ba-Ni-O secondary phases are marked according to ICDD PDF 04-009-3992 (rhombohedral $Ba_6Ni_5O_{15}$) and 04-007-8462 (hexagonal $BaNiO_3$).