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RESEARCH ARTICLE

Effect of target nickel stoichiometry on the synthesis of infinite-layer nickelates

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Supporting Information

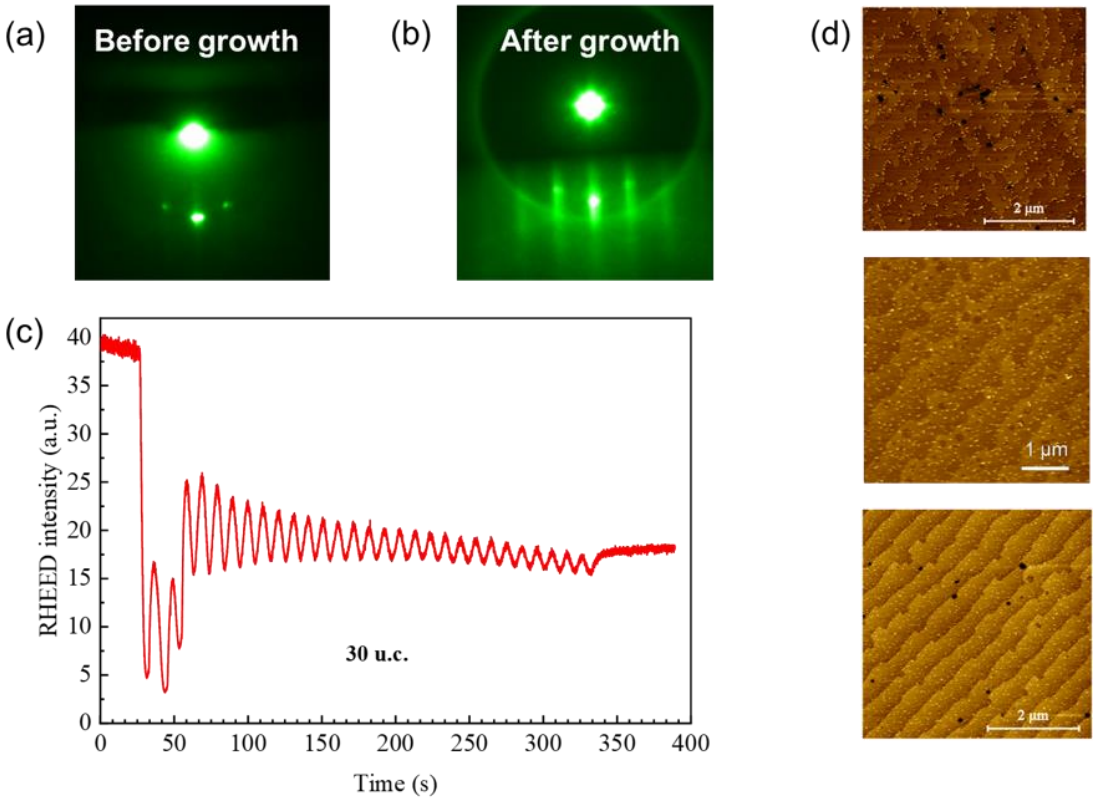

Fig. S1 (a,b) Reflection high-energy electron diffraction RHEED pattern of $SrTiO_3$ substrates and $Nd_{0.8}Sr_{0.2}Ni_{1.15}O_3$ thin film. **(c)** Layer-by-layer growth of $Nd_{0.8}Sr_{0.2}Ni_{1.15}O_3$ thin film monitored in situ using RHEED. **(d)** Surface morphology of $Nd_{0.8}Sr_{0.2}Ni_{1.15}O_3/SrTiO_3$ thin films characterized by atomic force microscopy (AFM).

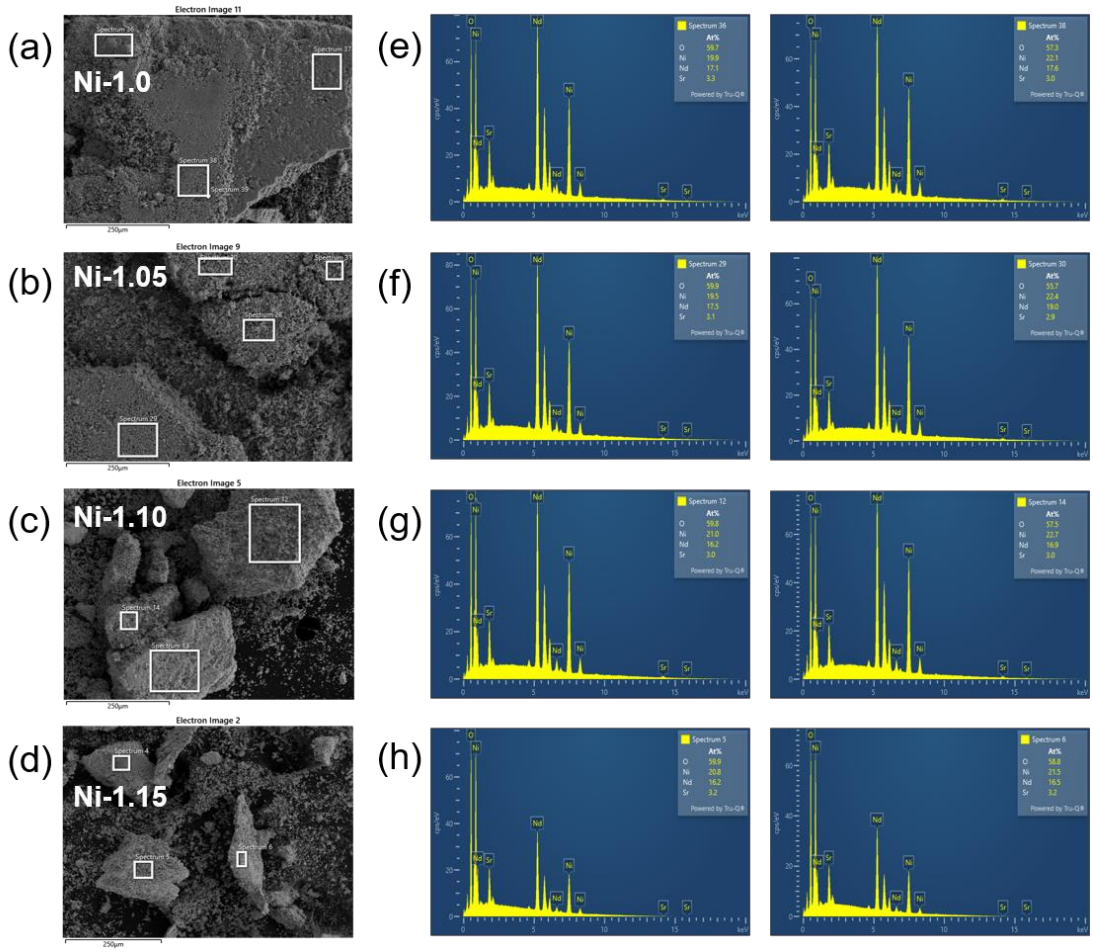

Fig. S2 (a-d) Scanning electron micrograph (SEM) images of (a) $Nd_{0.8}Sr_{0.2}Ni_{1.0}O_3$, (b) $Nd_{0.8}Sr_{0.2}Ni_{1.05}O_3$, (c) $Nd_{0.8}Sr_{0.2}Ni_{1.10}O_3$ and (d) $Nd_{0.8}Sr_{0.2}Ni_{1.15}O_3$ targets. **(e-h)** The typical energy dispersive spectroscopy (EDS) of the square areas picked in (a, b), respectively. The error margins for the atomic ratio of each element are as follows: 16% ± 3.2% for Nd, 4% ± 1.33% for Sr, 20% ± 2% for Ni, and 60% ± 6% for O.

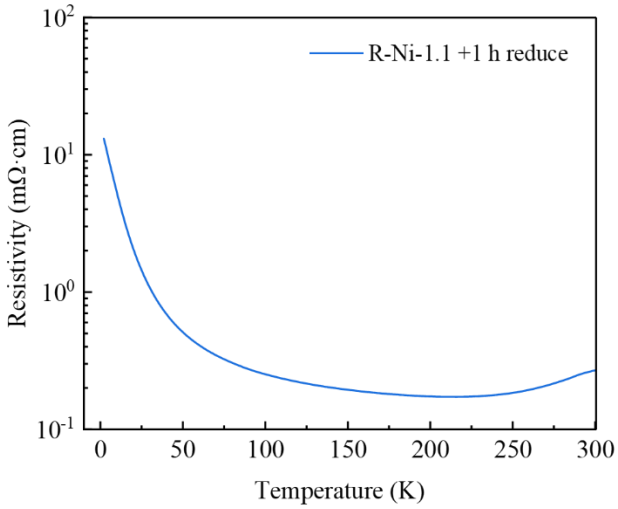

Fig. S3 Electrical transport properties of R-Ni-1.1 after 1 h additional reduction process.

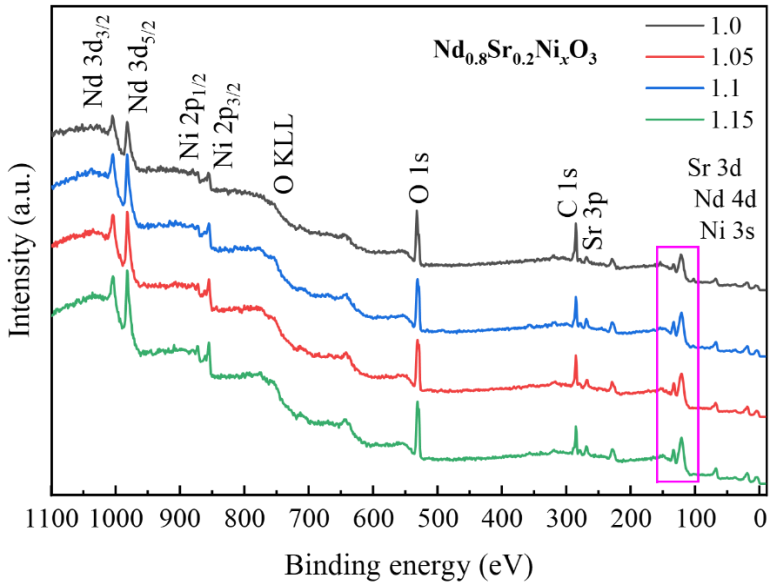

Fig. S4 Full range XPS spectra of as-grown $Nd_{0.8}Sr_{0.2}Ni_xO_3/SrTiO_3$ thin films.

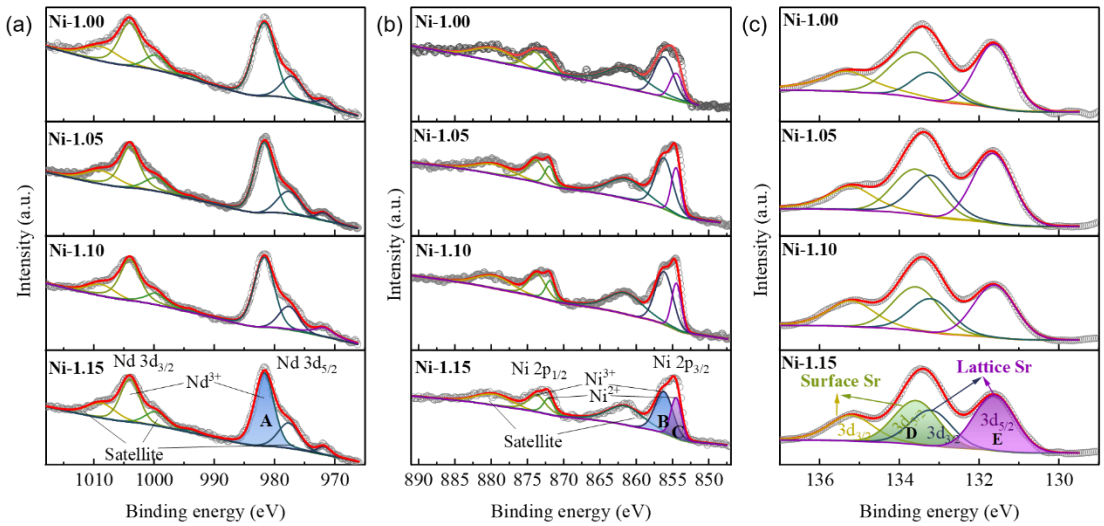

Fig. S5 XPS spectra of as-grown $Nd_{0.8}Sr_{0.2}Ni_xO_3/SrTiO_3$ films for **(a)** Nd 3d; **(b)** Ni 2p and **(c)** Sr 3d.