
Supplementary information

**Bulk superconductivity up to 96 K in
pressurized nickelate single crystals**

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Supplementary Information for

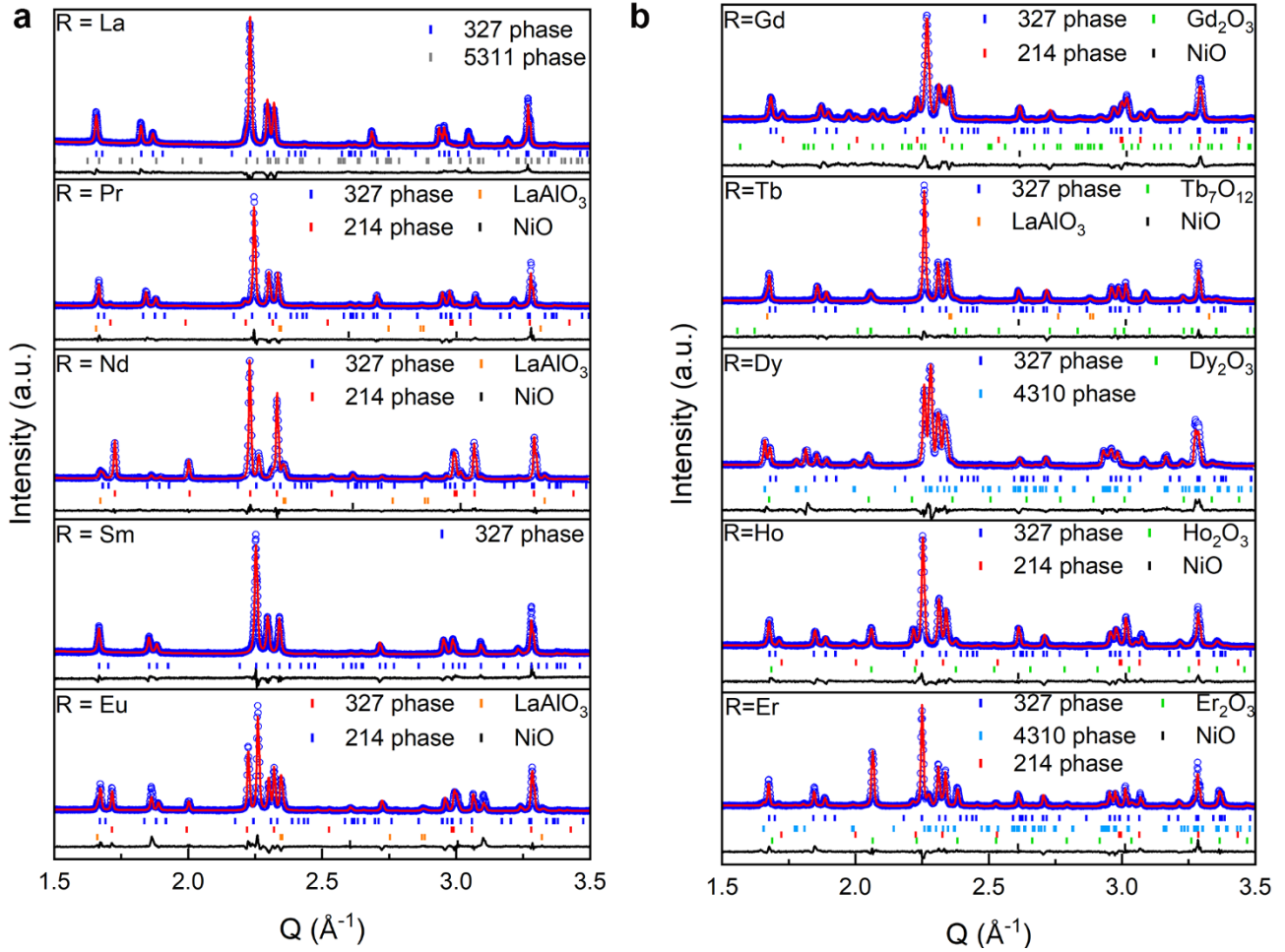
Bulk superconductivity up to 96 K in pressurized nickelate single crystals

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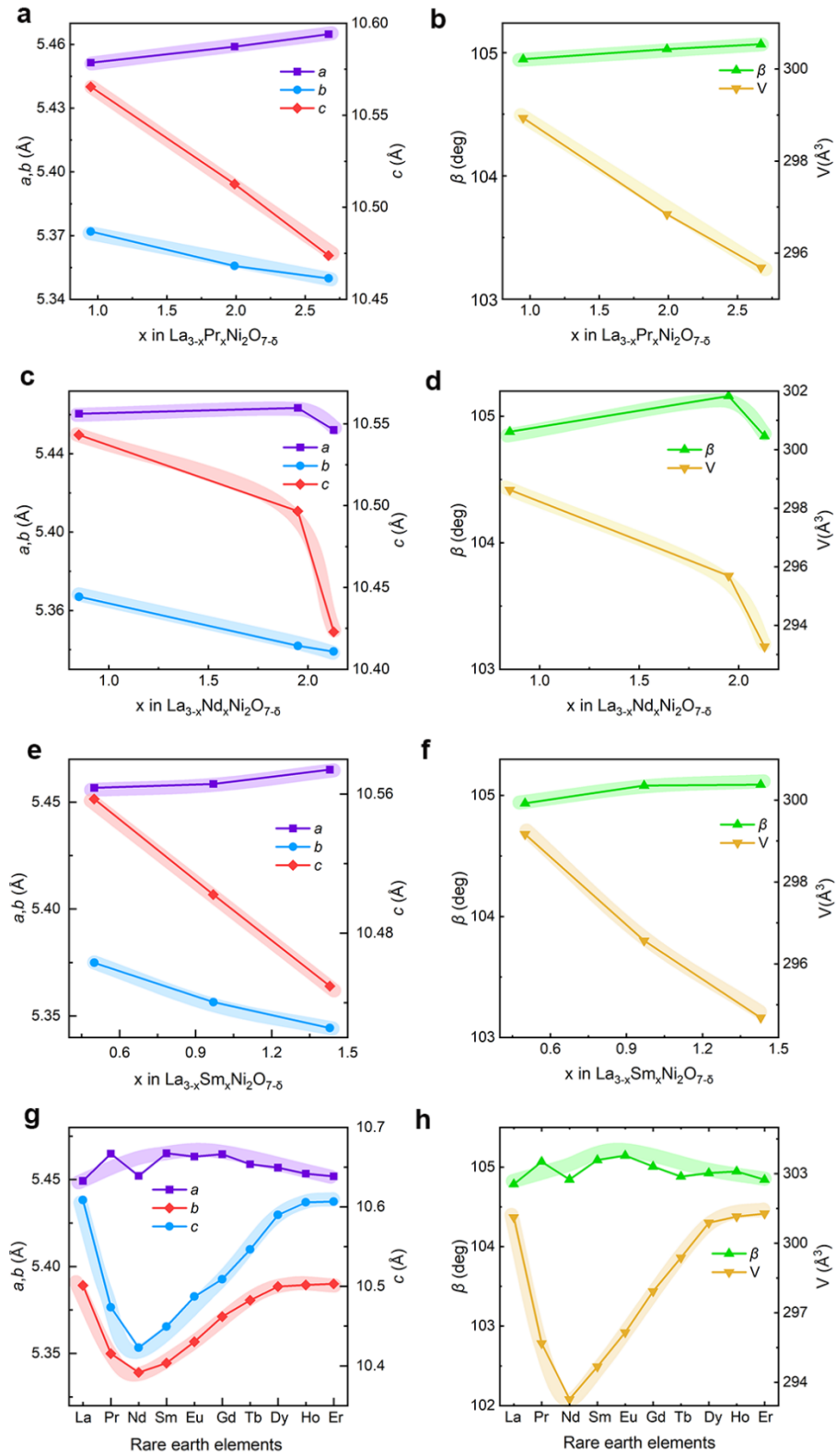
Supplementary Fig. 1: LeBail fit on powder diffraction data collected at room temperature of pulverized $\text{La}_{3-x}\text{R}_x\text{Ni}_2\text{O}_{7-\delta}$ (R=La-Er) single crystals grown from La:R=2:1 (feeding) in the flux.

Supplementary Fig. 2: Lattice parameters extracted from LeBail fit on powder diffraction data of pulverized $\text{La}_{3-x}\text{R}_x\text{Ni}_2\text{O}_{7-\delta}$ (R=La-Er) single crystals.

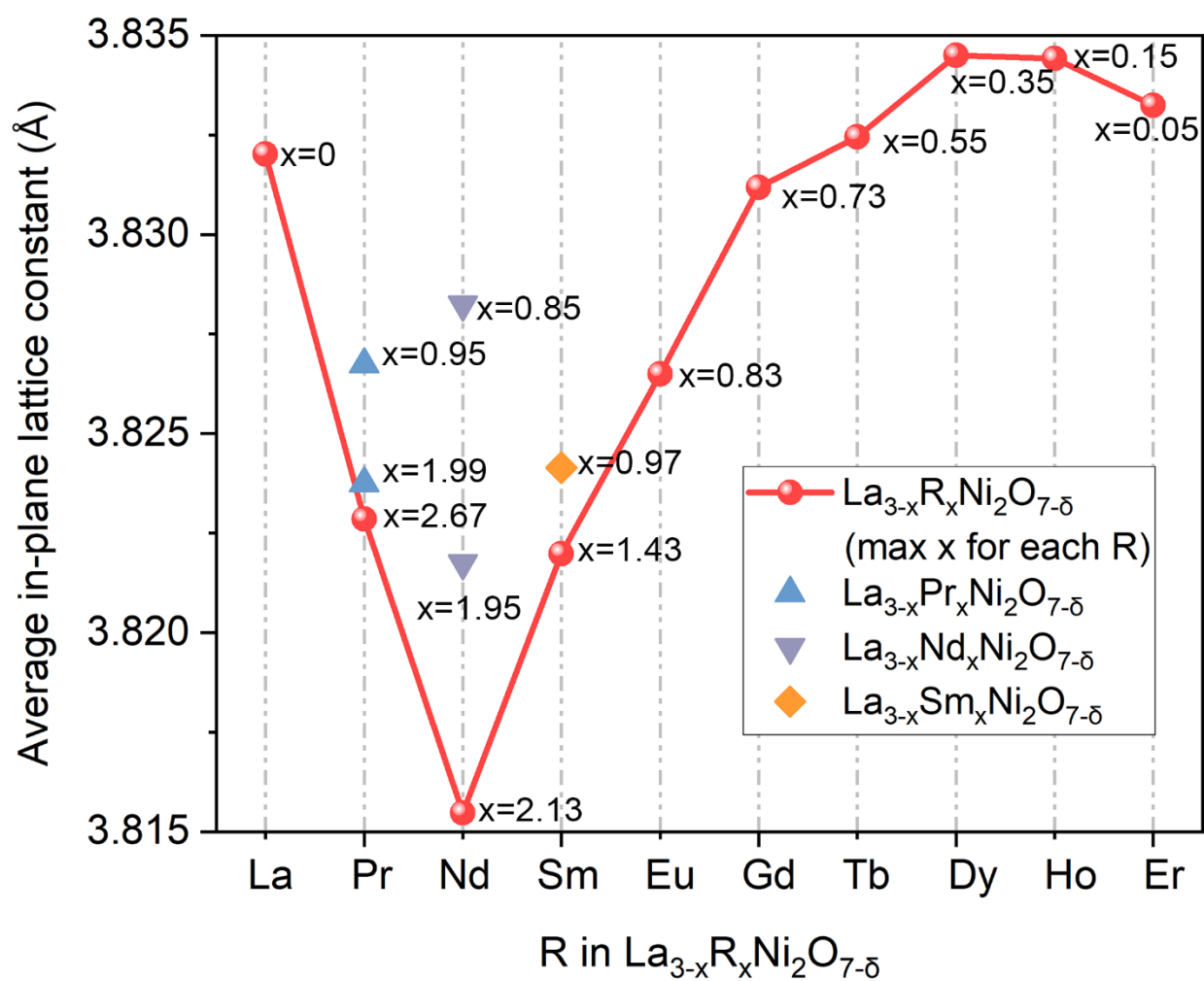
Supplementary Fig. 3: The average in-plane lattice constants of $\text{La}_{3-x}\text{R}_x\text{Ni}_2\text{O}_{7-\delta}$ (R=La-Er) calculated by $a_{\text{average}}=(a^2+b^2)^{1/2}/2$.



Supplementary Fig. 1 | LeBail fit on powder diffraction data collected at room temperature of pulverized $\text{La}_{3-x}\text{R}_x\text{Ni}_2\text{O}_{7-\delta}$ ($\text{R}=\text{La-Er}$) single crystals grown from $\text{La}:\text{R}=2:1$ (feeding) in the flux. **a.** $\text{R}=\text{La-Eu}$. **b.** $\text{R}=\text{Gd-Er}$. Note that the circle represents I_{obs} , the red line represents I_{cal} , the black line represents I_{diff} , and 327 phase indicates $\text{La}_{3-x}\text{R}_x\text{Ni}_2\text{O}_{7-\delta}$ (Space group: $P2_1/m$), 5311 indicates $\text{La}_2\text{NiO}_4 \cdot \text{La}_3\text{Ni}_2\text{O}_7$ (Space group: $Immm^1$), 214 phase indicates $\text{La}_{2-x}\text{R}_x\text{NiO}_4$ (Space group: $I4/mmm^2$) and 4310 phase indicates $\text{La}_{4-x}\text{R}_x\text{Ni}_3\text{O}_{10-\delta}$ (Space group: $P2_1/a^3$).



Supplementary Fig. 2 | Lattice parameters extracted from LeBail fit on powder diffraction data of pulverized $\text{La}_{3-x}\text{R}_x\text{Ni}_2\text{O}_{7-\delta}$ ($\text{R}=\text{La-Er}$) single crystals. **a,b** Lattice parameters for $\text{La}_{3-x}\text{Pr}_x\text{Ni}_2\text{O}_{7-\delta}$. **c,d** Lattice parameters for $\text{La}_{3-x}\text{Nd}_x\text{Ni}_2\text{O}_{7-\delta}$. **e,f** Lattice parameters for $\text{La}_{3-x}\text{Sm}_x\text{Ni}_2\text{O}_{7-\delta}$. **g,h** Lattice parameters for $\text{La}_{3-x}\text{R}_x\text{Ni}_2\text{O}_{7-\delta}$ ($\text{R}=\text{La-Er}$) with maximum x for each R.



Supplementary Fig. 3 | The average in-plane lattice constants of $\text{La}_{3-x}\text{R}_x\text{Ni}_2\text{O}_{7-\delta}$ ($\text{R}=\text{La-Er}$) calculated by $a_{\text{average}}=(a^2+b^2)^{1/2}/2$.

References

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