

Praseodymium Orthoniobate and Praseodymium Substituted Lanthanum Orthoniobate: Electrical and Structural Properties

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Table S1. Unit cell parameters of synthesized samples of $\text{La}_{1-x}\text{Pr}_x\text{NbO}_{4+\delta}$.

Sample	a (Å)	b (Å)	c (Å)	β (°)	V (Å ³)	R _{wp} (%)	χ^2
$\text{LaNbO}_{4+\delta}$	5.566(1)	11.524(1)	5.203(1)	94.083(1)	332.90(1)	9.4	4.17
$\text{La}_{0.95}\text{Pr}_{0.05}\text{NbO}_{4+\delta}$	5.562(1)	11.513(1)	5.201(1)	94.109(1)	332.16(1)	26.0	3.93
$\text{La}_{0.9}\text{Pr}_{0.1}\text{NbO}_{4+\delta}$	5.558(1)	11.505(1)	5.198(1)	94.115(1)	331.56(1)	15.4	2.13
$\text{La}_{0.85}\text{Pr}_{0.15}\text{NbO}_{4+\delta}$	5.555(1)	11.493(1)	5.195(1)	94.147(1)	330.81(1)	7.1	1.82
$\text{La}_{0.8}\text{Pr}_{0.2}\text{NbO}_{4+\delta}$	5.552(1)	11.487(1)	5.194(1)	94.176(1)	330.65(1)	6.8	2.49
$\text{La}_{0.7}\text{Pr}_{0.3}\text{NbO}_{4+\delta}$	5.544(1)	11.464(1)	5.187(1)	94.223(1)	328.77(1)	2.9	2.56
$\text{PrNbO}_{4+\delta}$	5.498(1)	11.340(1)	5.158(1)	94.554(1)	320.60(1)	6.9	2.89

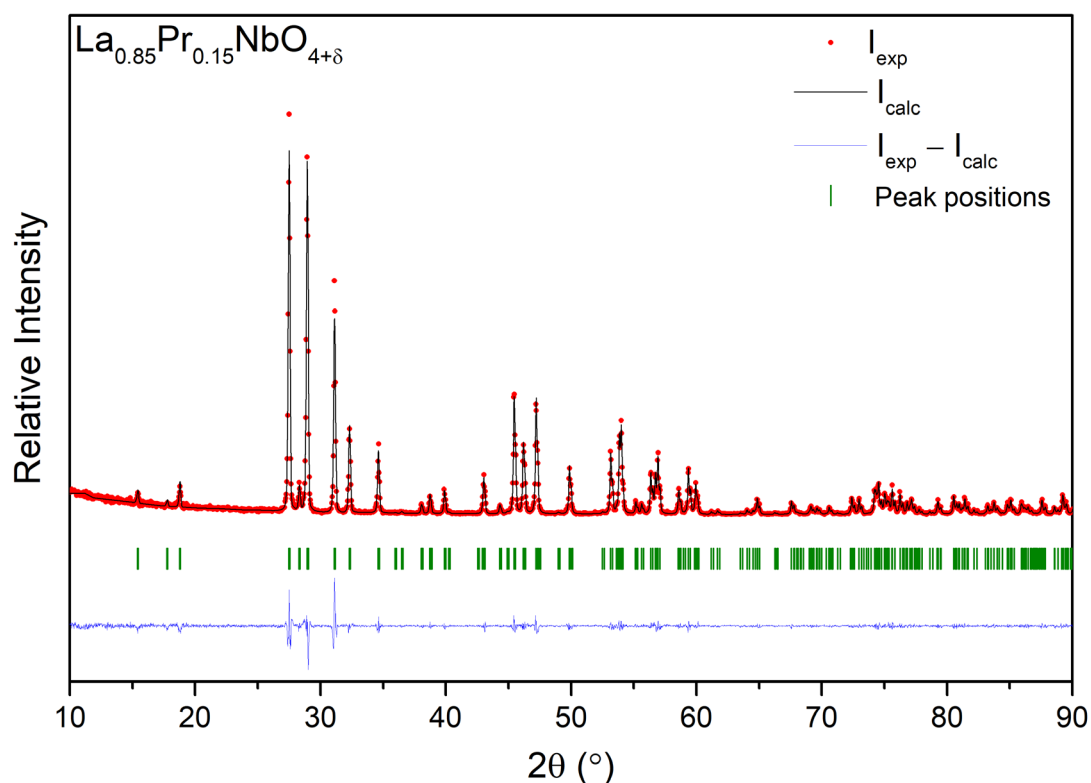


Figure S1. The LeBail fitted profiles of the pattern and difference plot for $\text{La}_{0.85}\text{Pr}_{0.15}\text{NbO}_{4+\delta}$.

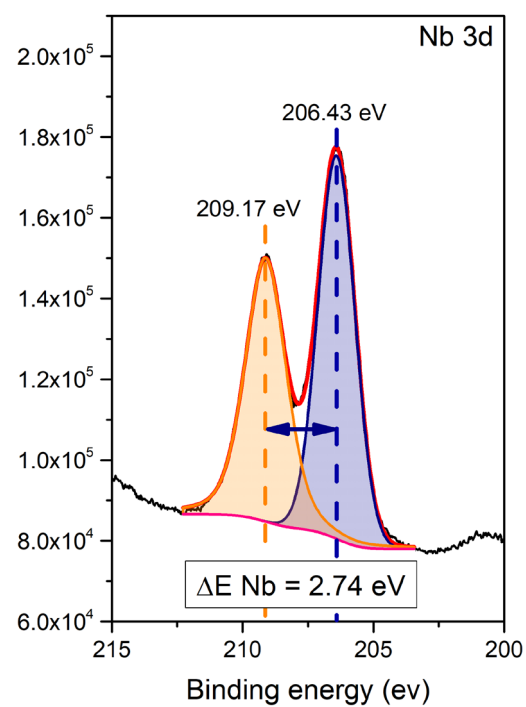


Figure S2. XPS spectrum of $\text{PrNbO}_{4+\delta}$ collected for Nb 3d band.

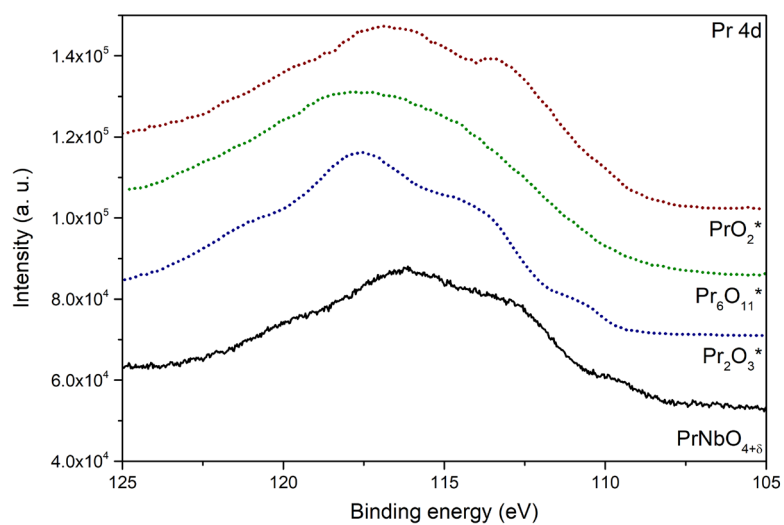


Figure S3. XPS spectrum collected for Pr 4d band, dotted lines represent the literature results measured for different praseodymium oxides by Lütkehoff et al. [65].

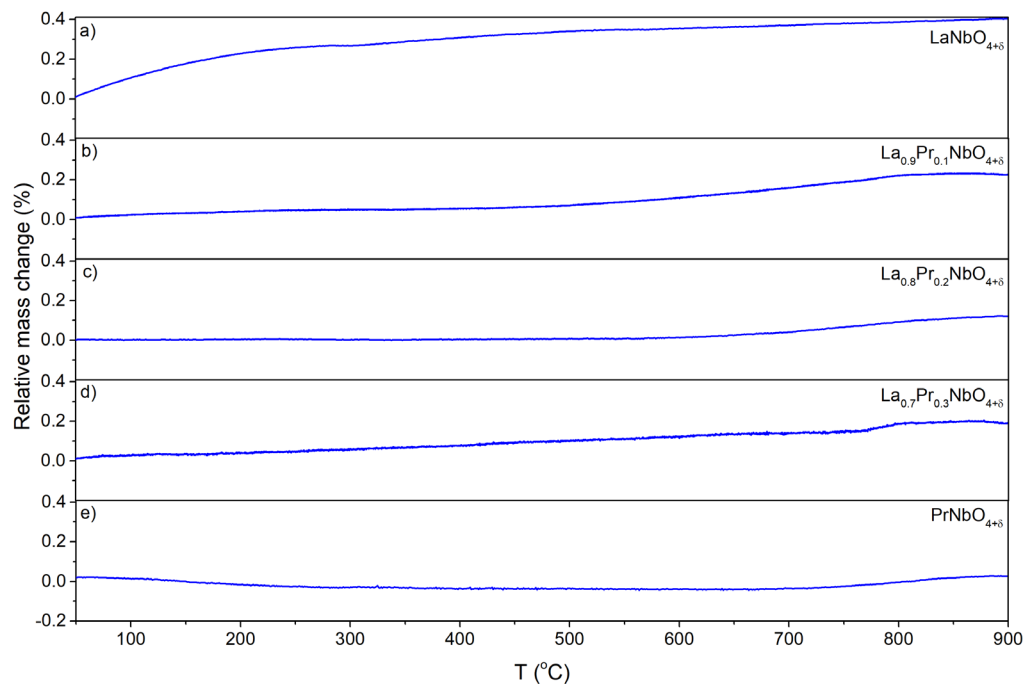


Figure S4. Dependence of the relative mass change of $\text{La}_{1-x}\text{Pr}_x\text{NbO}_{4+\delta}$ from temperature in the synthetic air.

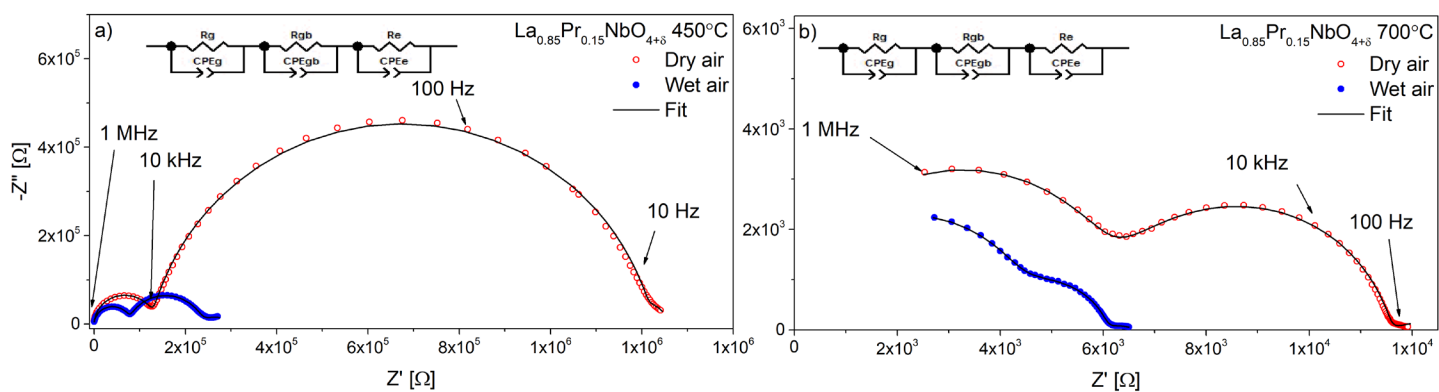


Figure S5. Nyquist plot acquired for $\text{La}_{0.85}\text{Pr}_{0.15}\text{NbO}_{4+\delta}$ in dry and wet air at a) 450°C and b) 700°C.

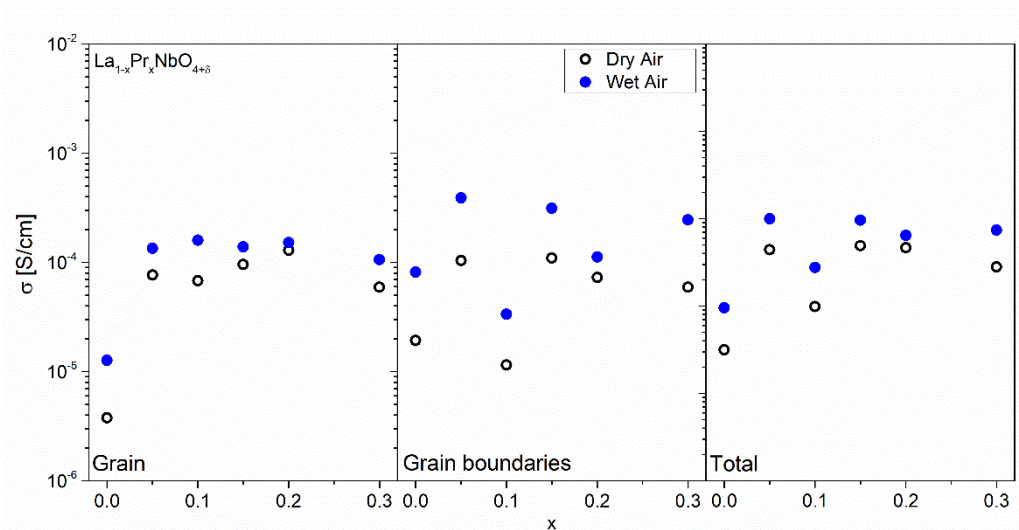


Figure S6. Total conductivity, grains conductivity and grain boundaries conductivity of $\text{La}_{1-x}\text{Pr}_x\text{NbO}_{4+\delta}$ in function of praseodymium content in dry ($p_{\text{H}_2\text{O}} = 6.0 \cdot 10^{-5}$ atm.) and wet ($p_{\text{H}_2\text{O}} = 2.4 \cdot 10^{-2}$ atm.) air at 700°C.

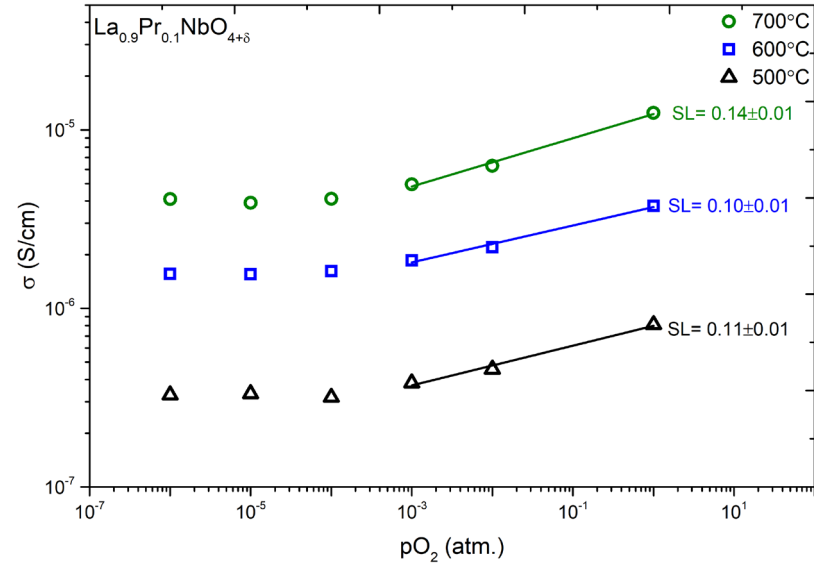


Figure S7. Total conductivity of $\text{La}_{0.9}\text{Pr}_{0.1}\text{NbO}_{4+\delta}$ as a function of oxygen partial pressure in dry gases ($p_{\text{H}_2\text{O}} = 6.0 \cdot 10^{-5}$ atm) at 500°C, 600°C and 700°C. The SL denotes the slope coefficient of the line describing the $\log(\sigma)$ in a function of $\log(p\text{O}_2)$.