materials

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Article

Analysis of Performance Losses and Degradation Mechanism in Porous $La_{2-x}NiTiO_{6-\delta}$:YSZ Electrodes

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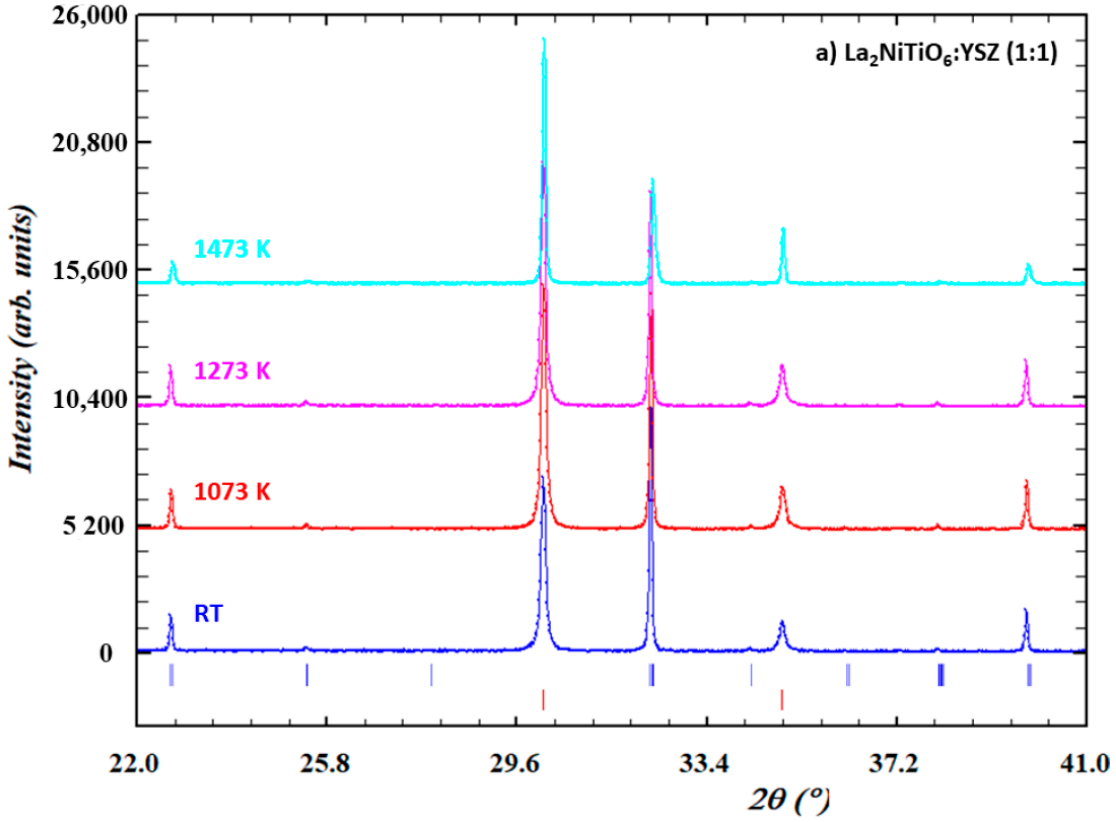


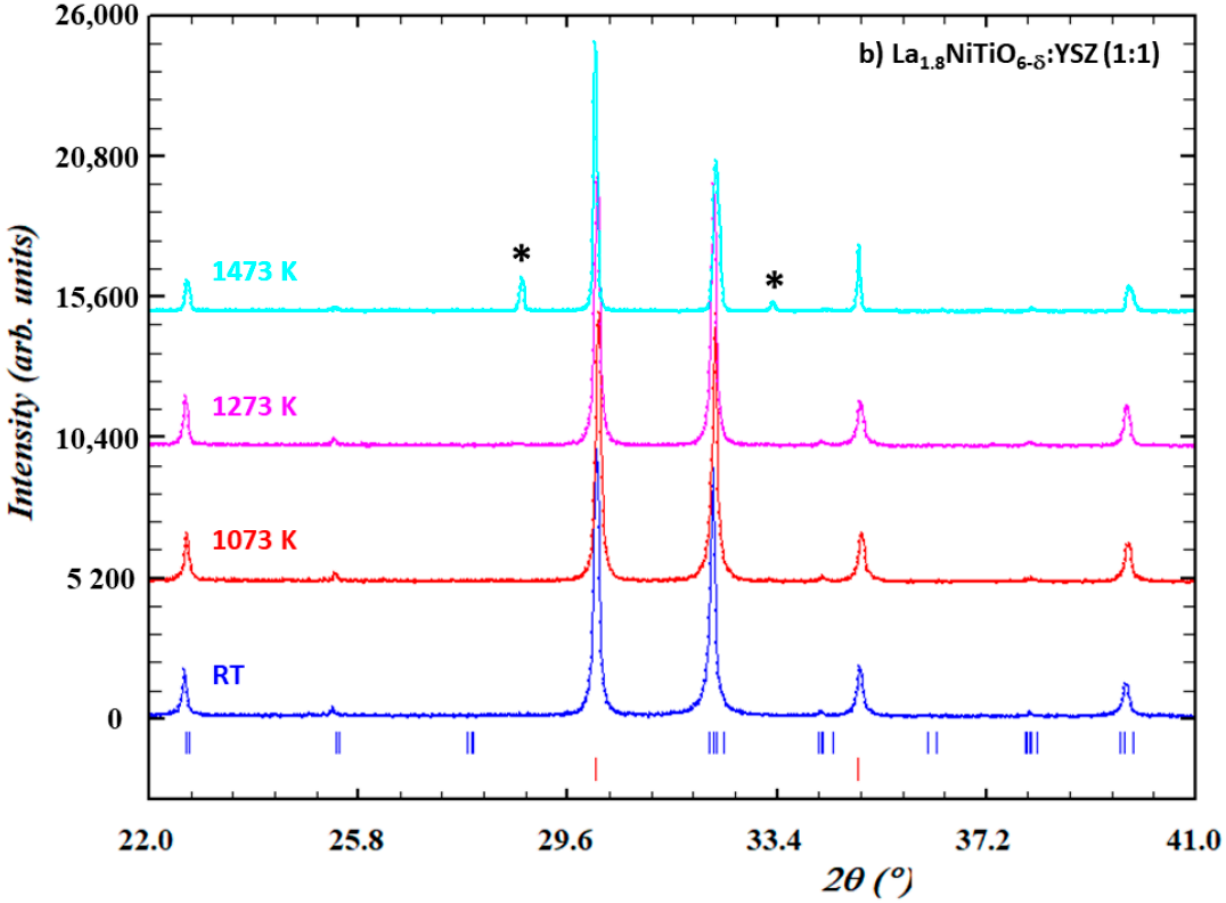


Figure S1. Selected XRD patterns of 1:1 mixture of $La_{2-x}NiTiO_{6-\delta}$ (**a**) x = 0 and (**b**) 0.2 with YSZ in air at RT (blue), 1073 K (red), 1273 K (pink) and 1473 K (cyan). Bragg peaks (vertical bars) of corresponding phases are found at the bottom ($La_{2-x}NiTiO_{6-\delta}$ in blue and YSZ in red). Asterisk shows the (222) and (400) diffraction peaks of $La_2Zr_2O_7$ phase.

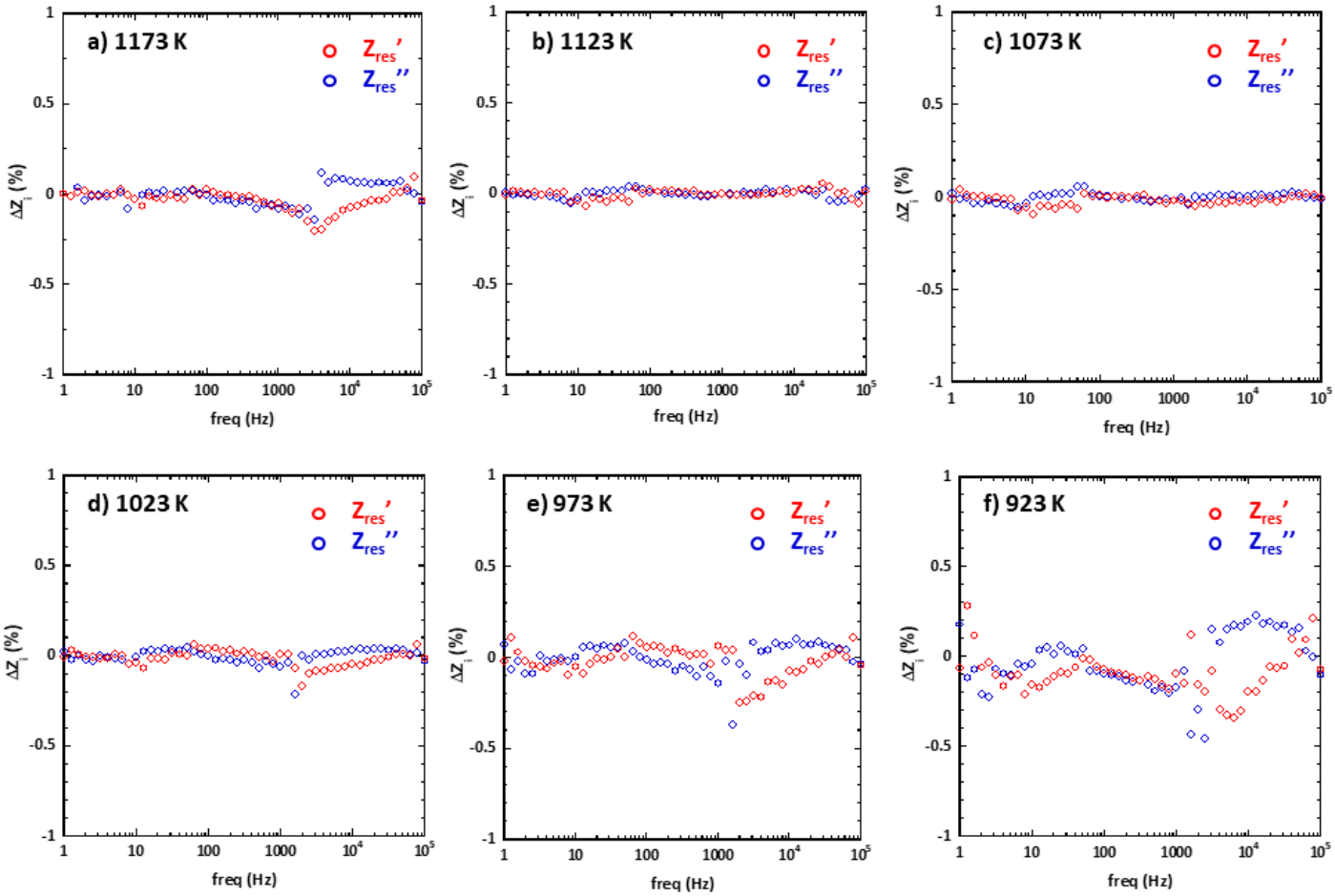


Figure S2. Relative differences plots (ΔZ_i) as obtained from the Kramers-Kronig test for La_2NiTiO_6 at (**a**) 1173 K, **b**) 1123 K, (**c**) 1073 K, (**d**) 1023 K, (**e**) 973 K and (**f**) 923 K.

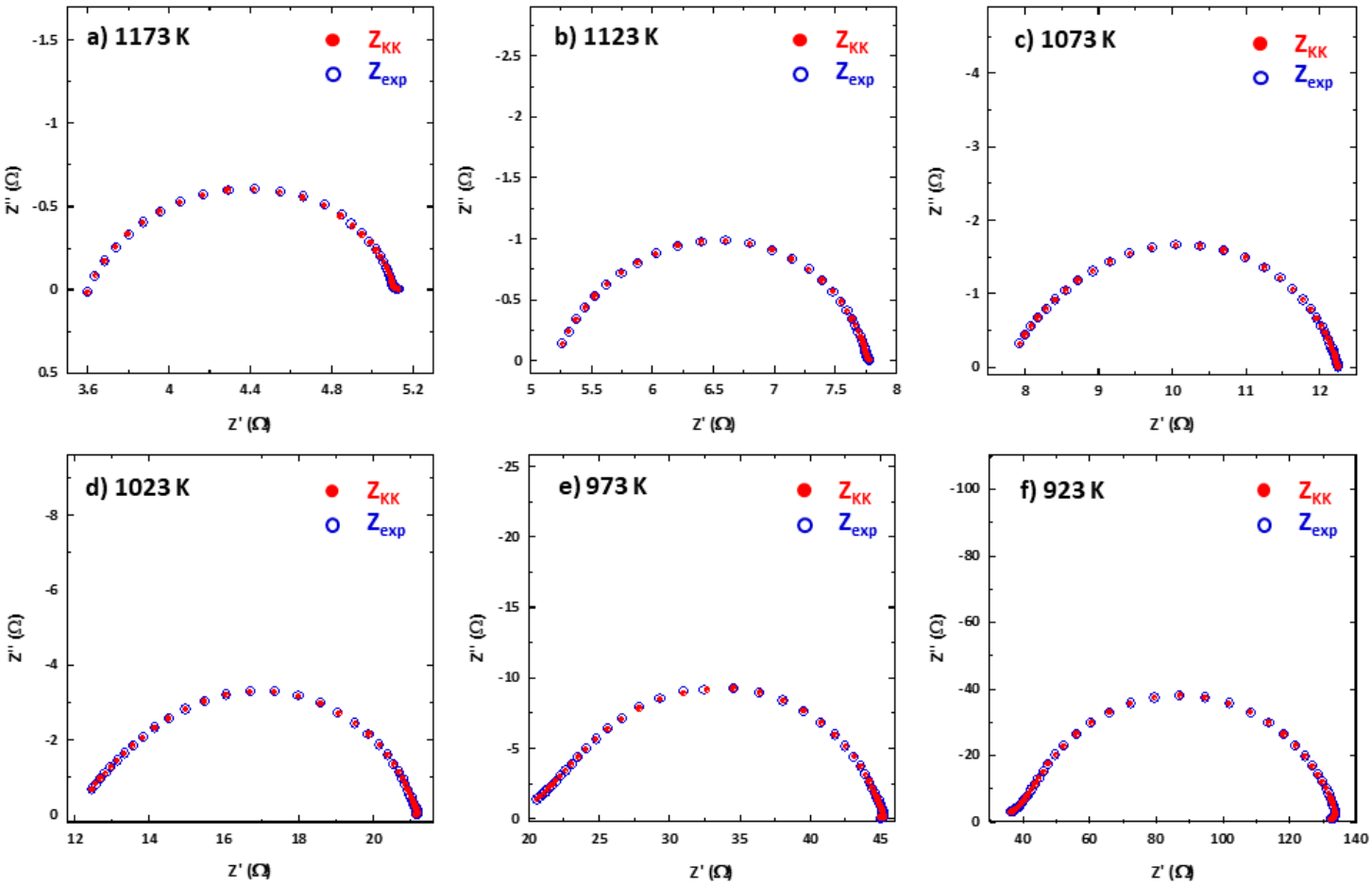


Figure S3. KK transform data in the complex plane (Z'' *vs.* Z') as obtained from the Kramers-Kronig test for La_2NiTiO_6 at (**a**) 1173 K, (**b**) 1123 K, (**c**) 1073 K, (**d**) 1023 K, (**e**) 973 K and (**f**) 923 K.

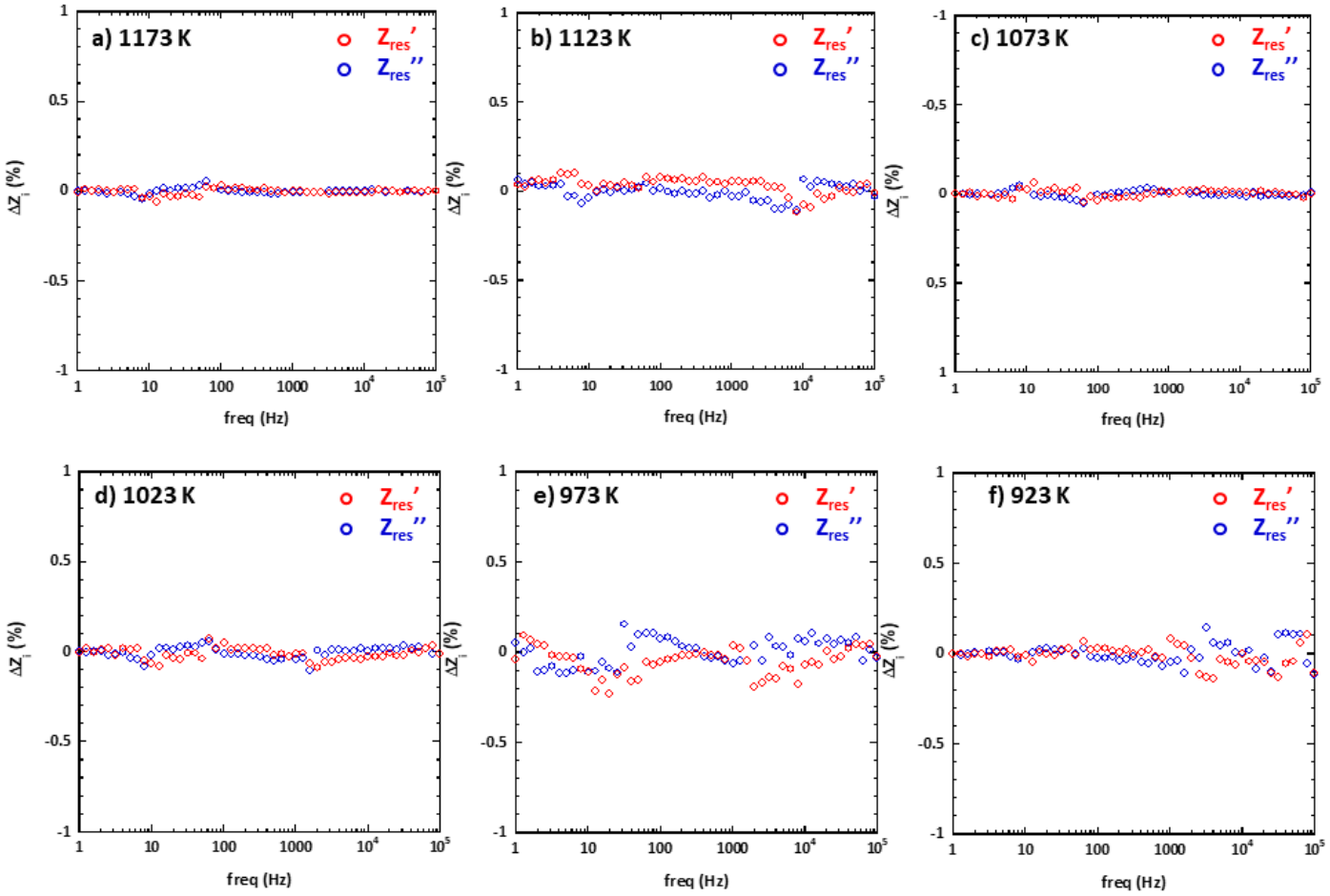


Figure S4. Relative differences plots (ΔZ_i) as obtained from the Kramers-Kronig test for $La_{1.8}Ni$-$TiO_{6-\delta}$ at (**a**) 1173 K, (**b**) 1123 K, (**c**) 1073 K, (**d**) 1023 K, (**e**) 973 K and (**f**) 923 K.

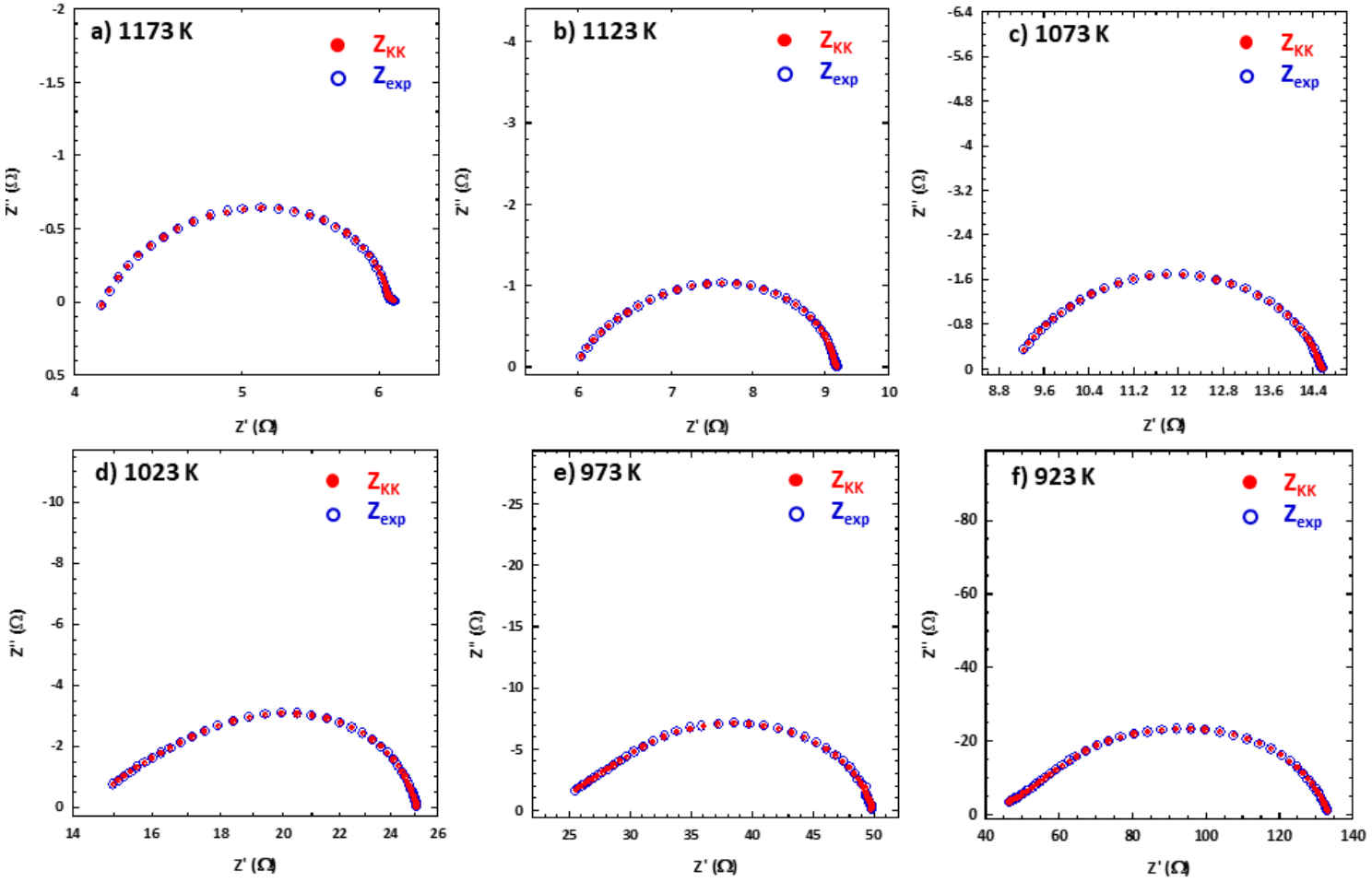
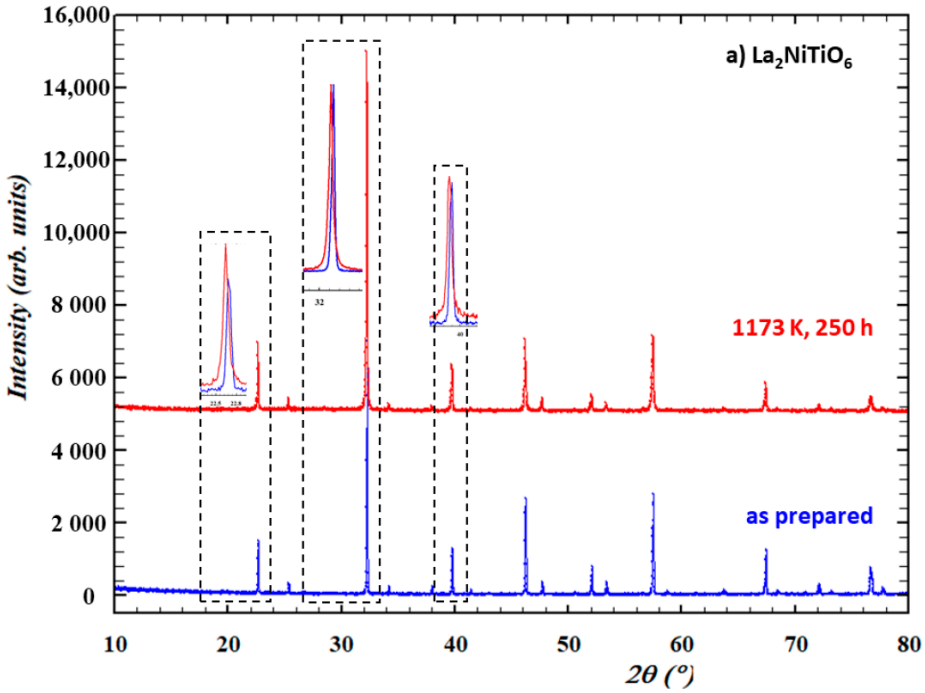


Figure S5. KK transform data in the complex plane (Z'' *vs.* Z') as obtained from the Kramers-Kronig test for $La_{1.8}NiTiO_{6-\delta}$ at (**a**) 1173 K, (**b**) 1123 K, (**c**) 1073 K, (**d**) 1023 K, (**e**) 973 K and (**f**) 923 K.



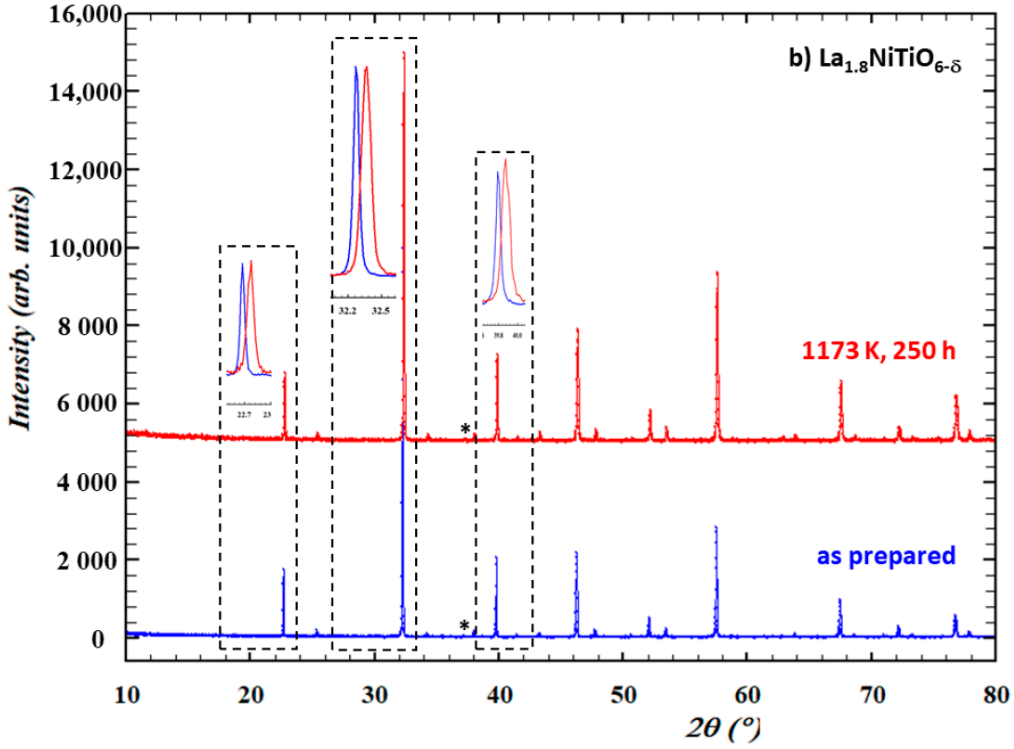
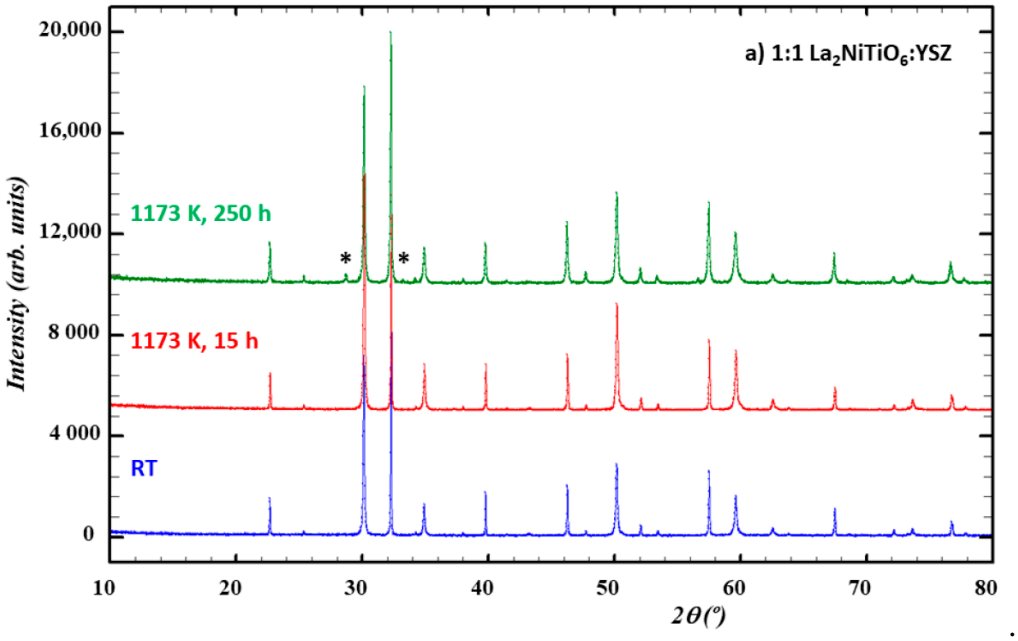


Figure S6. XRD patterns of $La_{2-x}NiTiO_{6-\delta}$ (**a**) x = 0 and (**b**) 0.2 at 1173 K for 250 h and comparison with corresponding starting materials at room temperature. Asterisk at 2θ ≈ 37.2° indicates the (111) diffraction peak of NiO phase.



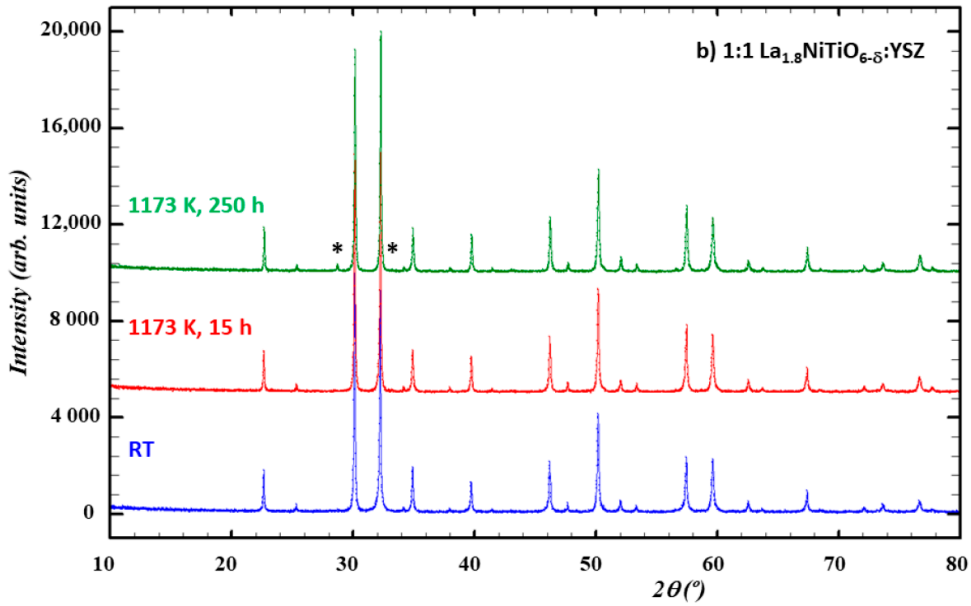


Figure S7. Comparison of XRD patterns of 1:1 $La_{2-x}NiTiO_{6-\delta}$:YSZ (**a**) x = 0 and (**b**) 0.2 at room temperature (RT, blue) and 1173 K for 15 h (red) and 250 h (green). Asterisks show the (222) and (400) diffraction peaks of $La_2Zr_2O_7$ phase.