# Operando Analysis of Losses in Commercial-Size Solid Oxide Cells: Methodology Development and Validation

A. Staffolani[a,*], A. Baldinelli[b], G. Bidini[b], F. Nobili[a], L. Barelli[b]

[a]Università di Camerino, School of Science and Technology Chemistry Division Via Madonna delle Carceri, I-62032 Camerino, Italy.

[b]Università degli Studi di Perugia, Department of Engineering, Via Duranti 93, 06125 Perugia, Italy

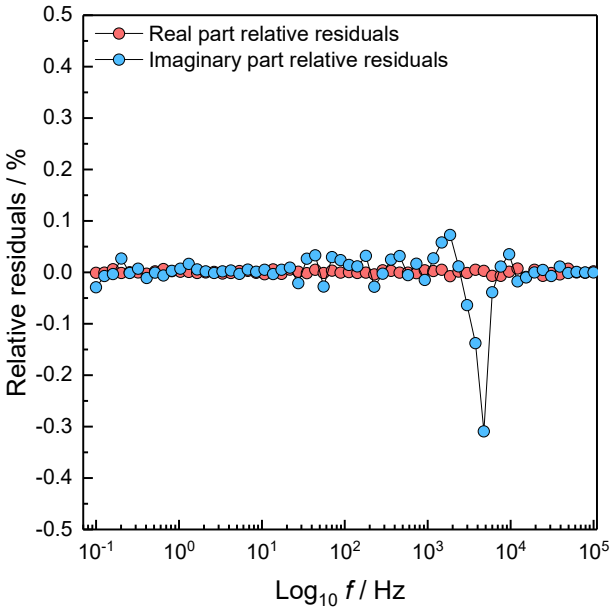


**Figure S1**. Kramers-Kronig test of an AC-response acquired at T = 800 °C, FE = $H_2$ 50 mL $min^{-1}$ ($xH_2$ = 97 %), AE = air 50 mL $min^{-1}$ ($xO_2$ = 21 %), j = 0 mA $cm^{-2}$.

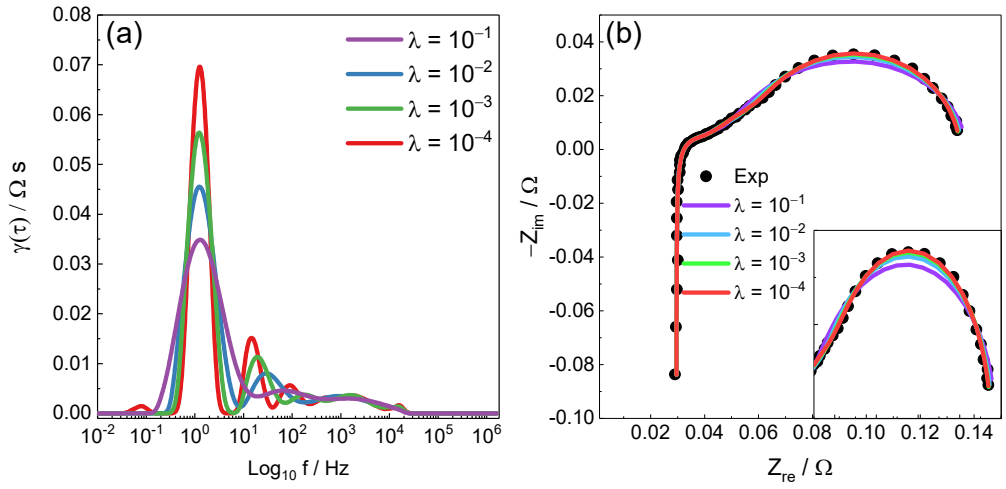


**Figure S2.** (**a**) DRT functions calculated with decreasing values of λ. (**b**) Nyquist plots reconstructed from the calculated DRT functions. Purple line λ = $10^{-1}$, blue line λ = $10^{-2}$, green line λ = $10^{-3}$, red line λ = $10^{-4}$. Impedance response acquired at T = 800 °C, FE = $H_2$ 50 mL $min^{-1}$ (**x$H_2$ = 97 %**), AE = air 50 mL $min^{-1}$ (**x$O_2$ = 21 %**), j = 0 mA $cm^{-2}$.

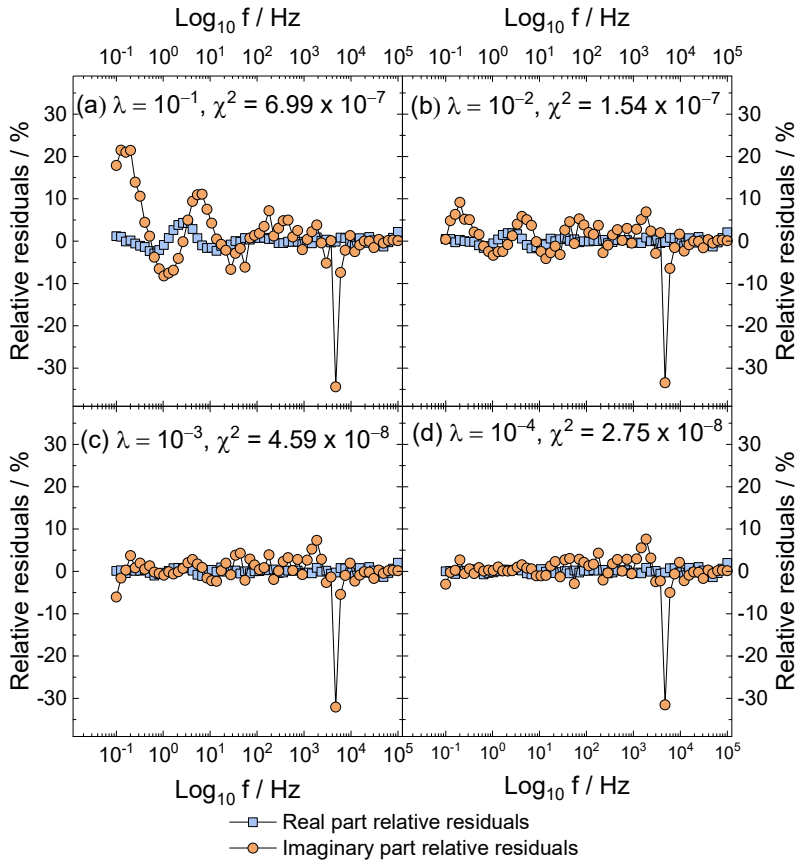


**Figure S3**. Relative residuals and pseudo $\chi^2$ of DRT functions calculated with (**a**) $\lambda = 10^{-1}$, (**b**) $\lambda = 10^{-2}$, (**c**) $\lambda = 10^{-3}$, and (**d**) $\lambda=10^{-4}$.

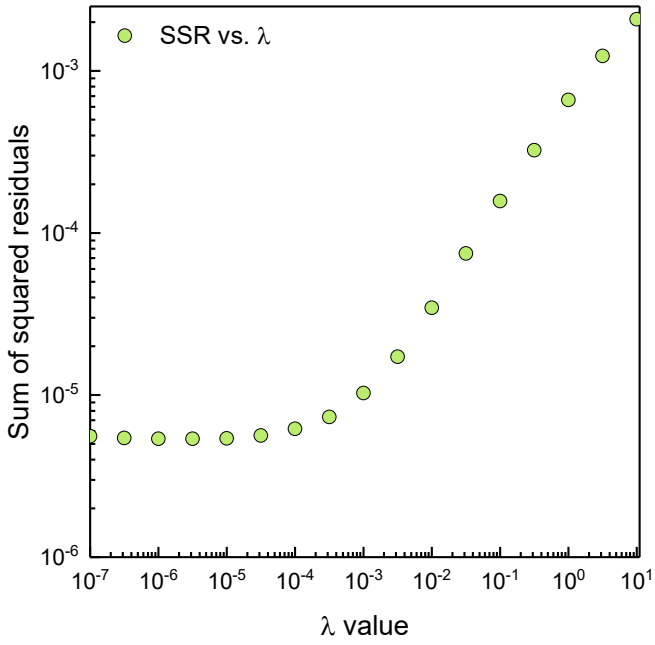


**Figure S4.** Sum of squared residuals vs. λ value plot.