Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Electronic supplementary information

ZrO_2 Atomic Layer Deposition Into $Sr_{0.5}Sm_{0.5}CoO_{3-\delta}$-$Ce_{0.9}Gd_{0.1}O_{2-\delta}$ Solid Oxide Fuel Cell Cathodes: Mechanisms of Stability Enhancement

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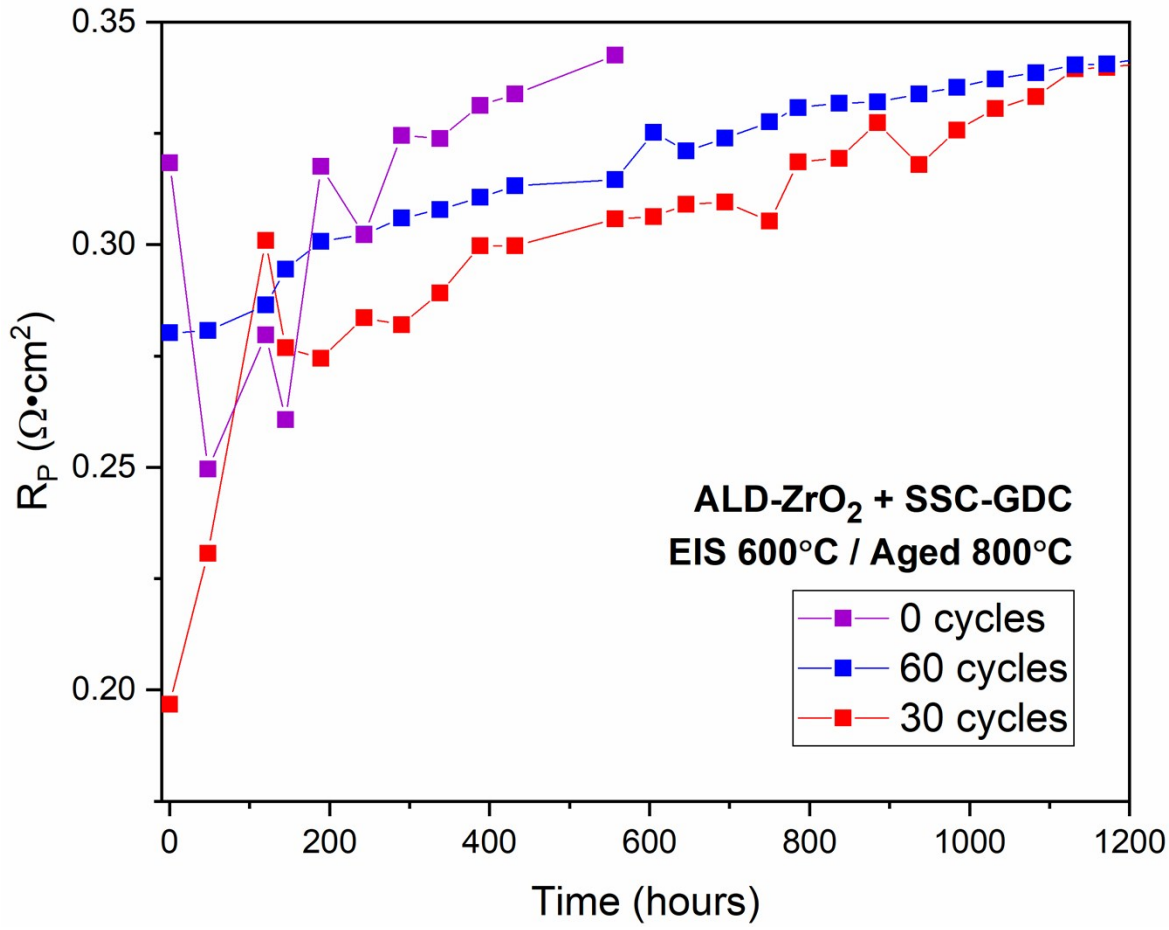

Fig. S1. Life-test trials for three cells produced and tested with the same conditions as in the main body text, except with 800°C ageing temperatures and thicker ~35 um SSC-GDC and ~20 um LSM electrodes. Data duplicated with permission from the thesis of Kevin Zhao, Northwestern University.[1]

1 K. Zhao, "Effect of Atomic Layer Deposition on Particle Coarsening and Surface Segregation in Solid Oxide Fuel Cell Cathodes," Masters Thesis, Northwestern University, 2016.

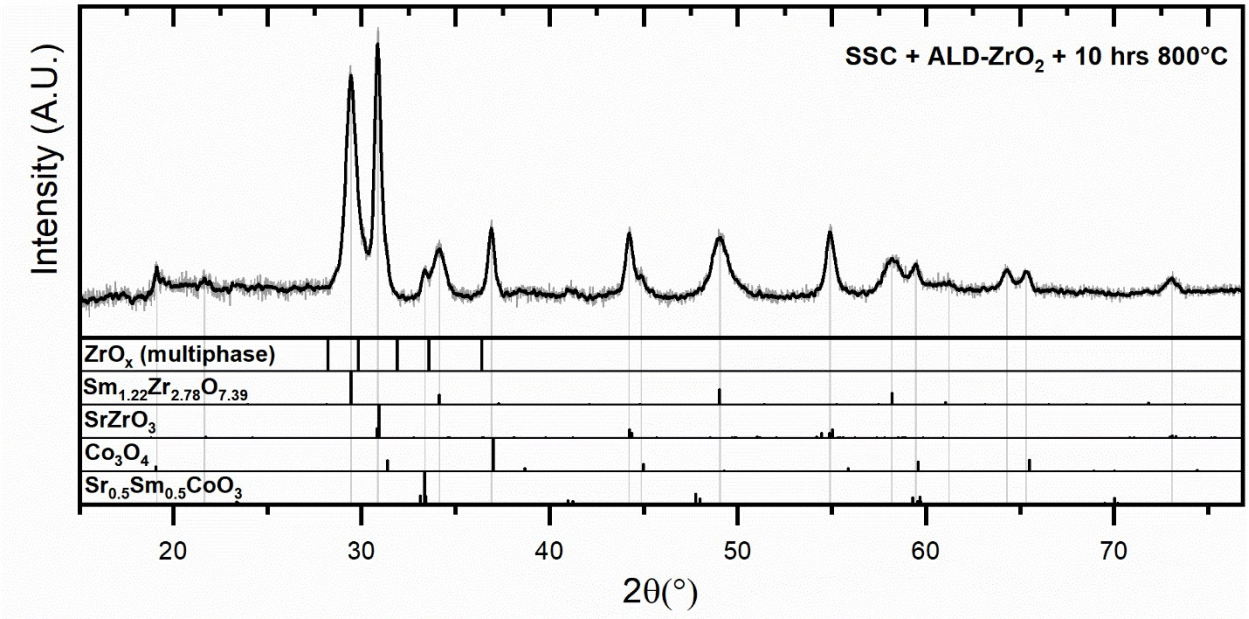

Fig. S2. XRD result of SSC powder with ALD-ZrO_2 annealed at a higher temperature of 800°C for 10 hours. The largest peak for SSC, ~33°, recedes into a small shoulder on a larger Sm-zirconate peak, while the other peaks of SSC greatly diminish in favor of Sr- and Sm-zirconates and Co_3O_4. Evidence of crystalline zirconia phases are not found. Unbalanced, the reaction chemistry is: $ZrO_2 + Sr_{0.5}Sm_{0.5}CoO_3 \rightarrow SrZrO_3 + Sm_{1.22}Zr_{2.78}O_{7.39} + Co_3O_4$. The PDF card number for the Sm-zirconate is 04-021-6444; the other phases are included in main text Fig. 6.