

Supporting Information

Characteristics of YCoO₃ type Perovskite Oxide and Application as an SOFC Cathode

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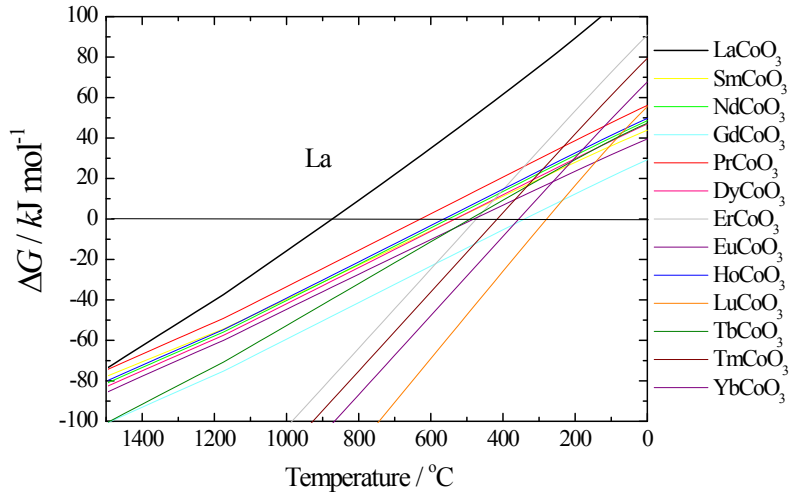
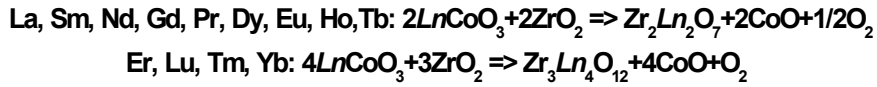


Fig. S1. Gibbs free energy ΔG , of the reaction between $LnCoO_3$ and ZrO_2 as a function of temperature calculated from the thermodynamic database (MALT-2). In this figure, $LnCoO_3$ and ZrO_2 react and form the pyrochlore phase (or $Ln_4Zr_3O_{12}$ phase ¹⁶) when ΔG became negative. Only the La based cobaltite ($LaCoO_3$) can maintain a positive ΔG up to around 900 °C, which indicates that the current La based cathode is the most stable toward the ZrO_2 electrolyte.

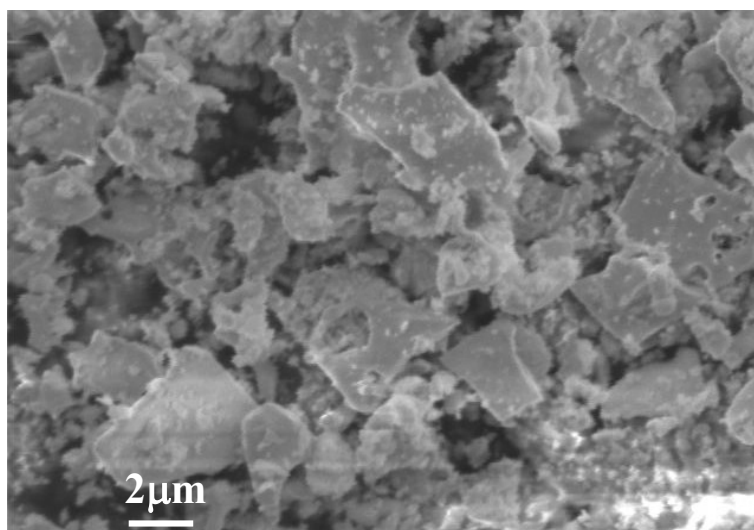


Fig. S2. SEM image of YCO-096 cathode powder after ball-milling with 15 mm milling media at 300 rpm for 1 h.

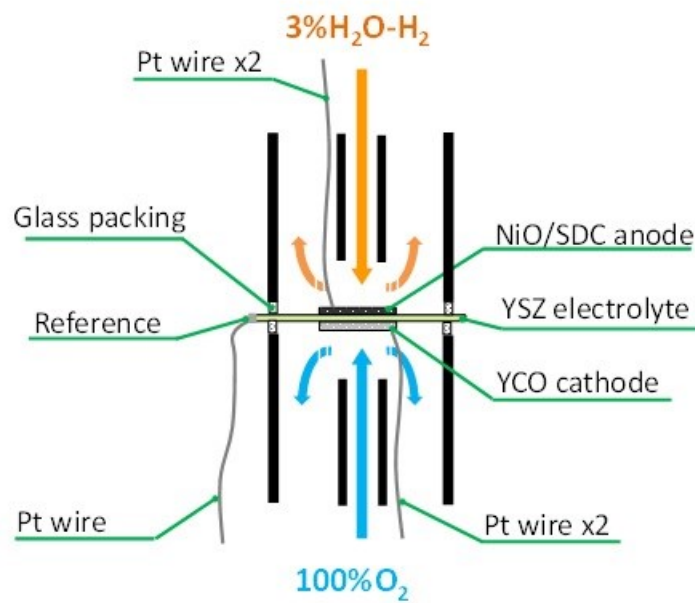


Fig. S3. Schematic illustration of the experimental apparatus for the SOFC power generation test using the YCO cathode cell.

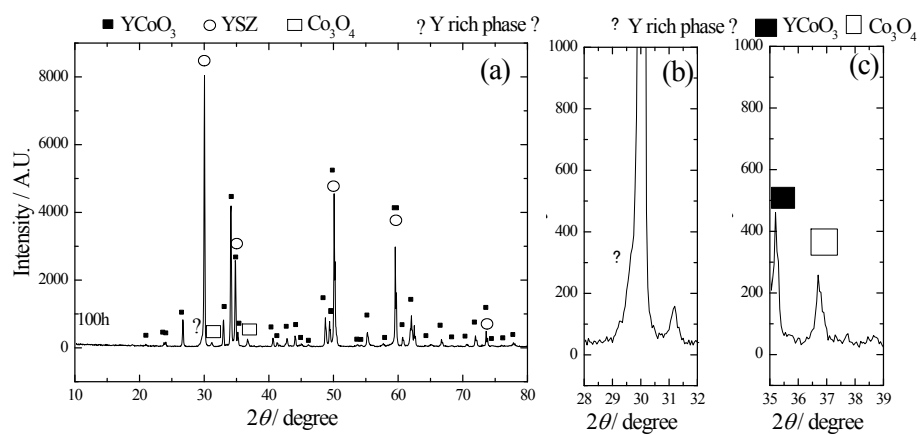


Fig. S4. XRD pattern of a mixture of $Y_{0.96}CoO_{3-\delta}$ and YSZ-8 heated at 975 °C for 100 h. The weight ratio of the YCO-YSZ mixture was 1:1. (a) XRD pattern from 10° to 80°, (b) magnified pattern from 28° to 32°, and (c) magnified pattern from 35° to 39°.

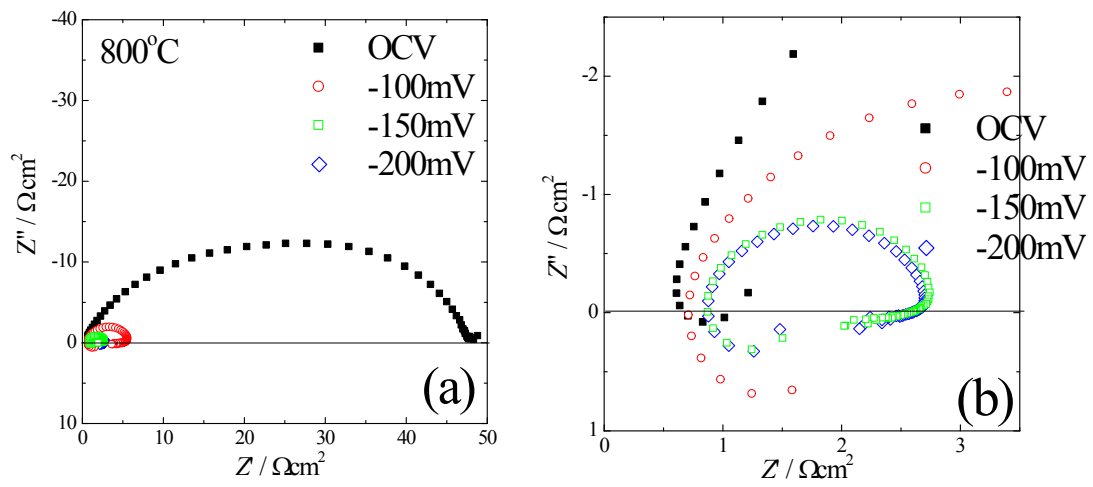


Fig. S5 Impedance spectra of the YCO cathode measured under OCV or cathodic biased condition. Overall view (a), and magnified spectra around ohmic resistance (b).