Supplementary Figure. 10 The cathode area specific resistance of BSCF in the symmetric cell configuration (10 µm cathodes deposited onto 1 mm SDC electrolyte) under selected atmospheres with and without CO₂ at 550 °C and with and without H₂O at 400 °C; (a) impedance spectra collected at 550 °C under 0.2 atm O₂ (balance helium), curve 1; under 0.2 atm O₂ + 0.05 atm CO₂ (balance helium) after equilibration for 120 minutes, curve 2; and under 0.2 atm O₂ (balance helium) after a brief treatment at 725 °C subsequent to CO₂ exposure, curve 3; (b) cathode area specific resistance as a function of time of exposure to CO₂ at 550 °C; and (c) impedance spectra collected at 400 °C under 0.2 atm O₂ (balance helium), curve 1; and under 0.2 atm O₂ + 0.03 atm H₂O (balance helium) after equilibration for ~10 minutes, curve 2. The cathode resistance dramatically increased upon exposure to CO₂, presumably due to formation of barium carbonate on the cathode surface. High temperature treatment was sufficient to remove surface CO₂ and recover the cathode performance. In contrast, the cathode resistance dropped upon exposure to H₂O at 400 °C. This behavior is also likely due to interactions with barium, in this case via the formation of barium hydroxide surface groups.