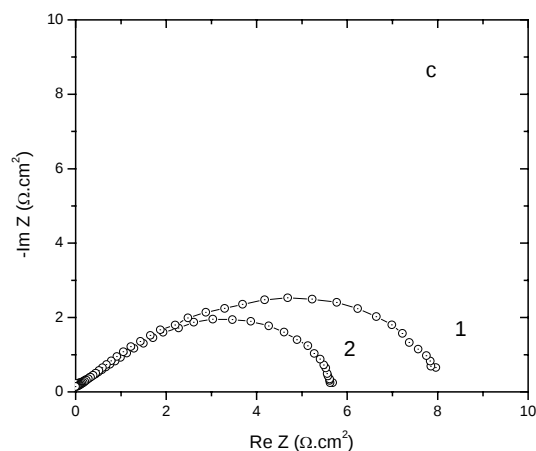
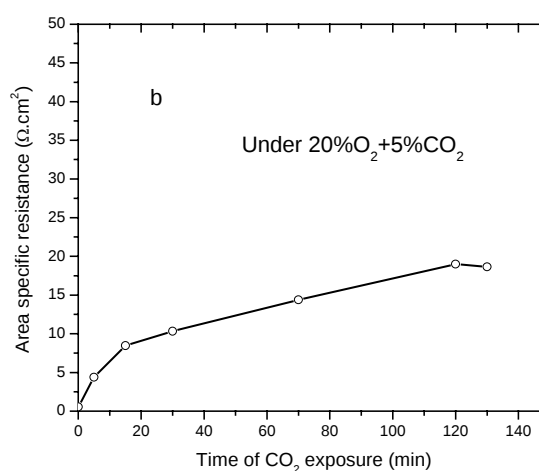
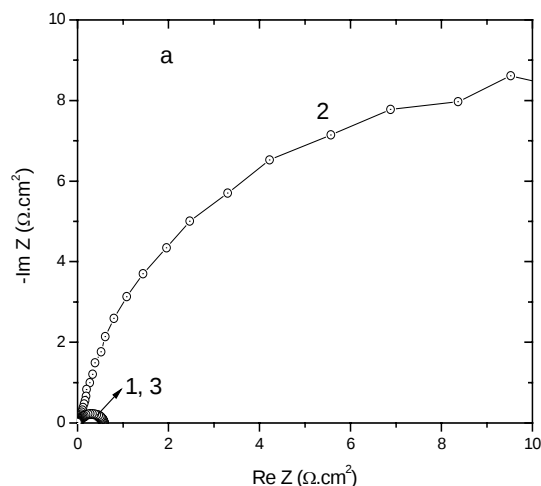




Supplementary Figure. 10 The cathode area specific resistance of BSCF in the symmetric cell configuration (10 μm cathodes deposited onto 1 mm SDC electrolyte) under selected atmospheres with and without CO_2 at 550 $^\circ\text{C}$ and with and without H_2O at 400 $^\circ\text{C}$; (a) impedance spectra collected at 550 $^\circ\text{C}$ under 0.2 atm O_2 (balance helium), curve 1; under 0.2 atm O_2 + 0.05 atm CO_2 (balance helium) after equilibration for 120 minutes, curve 2; and under 0.2 atm O_2 (balance helium) after a brief

treatment at 725 $^\circ\text{C}$ subsequent to CO_2 exposure, curve 3; (b) cathode area specific resistance as a function of time of exposure to CO_2 at 550 $^\circ\text{C}$; and (c) impedance spectra collected at 400 $^\circ\text{C}$ under 0.2 atm O_2 (balance helium), curve 1; and under 0.2 atm O_2 + 0.03 atm H_2O (balance helium) after equilibration for ~ 10 minutes, curve 2. The cathode resistance dramatically increased upon exposure to CO_2 , presumably due to formation of barium carbonate on the cathode surface. High temperature treatment was sufficient to remove surface CO_2 and recover the cathode performance. In contrast, the cathode resistance dropped upon exposure to H_2O at 400 $^\circ\text{C}$. This behavior is also likely due to interactions with barium, in this case via the formation of barium hydroxide surface groups.