## Supplementary Materials

## Characterization of $Pr_{0.5}A_{0.5}Fe_{0.9}W_{0.1}O_{3-\delta}$ (A = Ca, Sr and Ba) as Symmetric Electrodes for Solid Oxide Fuel Cells

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Fig. S1 Chemical compatibility of PCaFW and PSrFW with LSGM electrolyte.

Compositions		Space	Lattice Parameters				R <sub>p</sub>	R <sub>wp</sub>	R <sub>exp</sub>	$\chi^2$
		Group	a (Å)	b (Å)	c (Å)	V (Å <sup>3</sup> )	(%)	(%)	(%)	
PCaFW	Oxidized	Pnma	5.452(0)	7.721(4)	5.499(1)	231.218	5.38	7.36	3.81	1.74
	Reduced	Pnma	5.475(9)	7.752(5)	5.512(2)	234.008	8.81	6.62	8.72	1.77
PSrFW	Oxidized	Pnma	5.518(4)	7.799(6)	5.526(6)	237.876	3.92	5.02	3.48	1.08
	Reduced	Pnma	5.530(8)	7.827(5)	5.532(4)	239.549	5.76	7.26	6.01	1.46

Table S1 Summary of lattice parameters of oxidized and reduced for PCaFW and PSrFW samples.



Fig. S2 TGA curves of two candidate powders in air.



Fig. S3 Arrhenius plot of the  $R_p$  value for two candidate samples under different evaluated temperatures.



**Fig. S4** linear slope of total polarization resistances for the PAFW symmetric cells (PCaFW (a, c) and PSrFW (b, d)) with different partial pressures at temperatures range from 800 to 700 °C. (a, b) oxygen partial pressures and (c, d) hydrogen partial pressures.



**Fig. S5** long-term stability testing at 700 °C (a, b) and redox stability testing at 800 °C (c, d) for two candidates.