Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supplementary information

Perspective on high-temperature surface oxygen exchange in porous mix-conducting ceramic for solid oxide cell

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Table S1 Calculation-based parameters for equations 17-21

Parameter	value
the difference in lattice oxygen concentration between the initial and the final state (c_O-c_e) (mol cm^{-3})	304*
pore radius (r) (m)	3E-08
porosity (ε)	0.45
sample thickness (L) (m)	1.67E-04
tortuosity ($\bar{\tau}$)	2
gaseous oxygen viscosity (η) (Pa s)	1E-06
current density (i) (A m^{-2})	20000
Knudsen diffusion coefficient ($D_{O2,K}$) (m^2 s^{-1})	8.88E-06#
self-diffusion coefficient ($D_{O2,s}$) (m^2 s^{-1})	2.19E-04#

* Assuming the difference in lattice oxygen concentration between the initial and final states is independent of temperature.

The Knudsen diffusion and self-diffusion coefficients are calculated at 800 ℃.

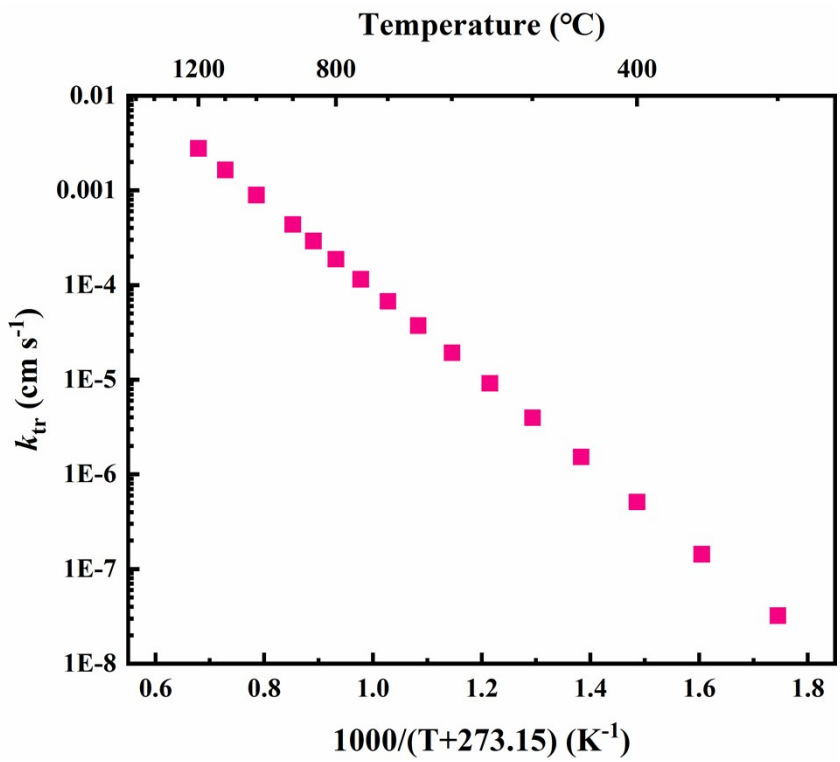

Fig. S1 Dependence of temperature on trace surface exchange coefficient (k_{tr}) of $Ba_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\delta}$. Data collected from ref 30.