

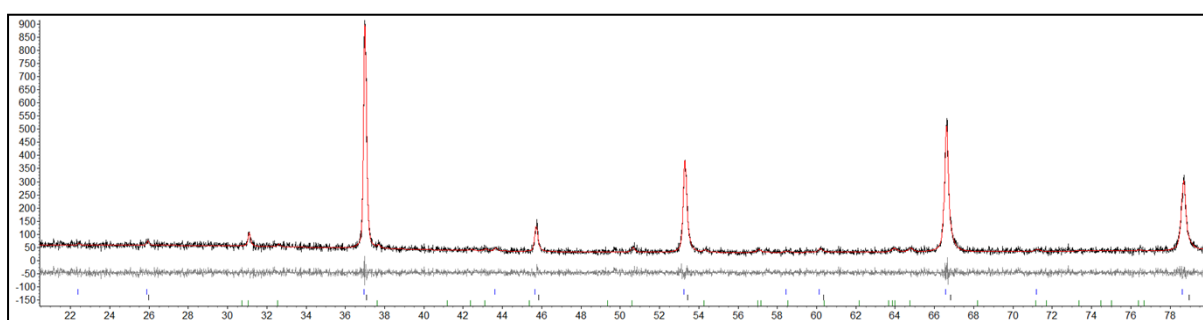
Supplementary Information

Oxygen permeation and stability of Mo-substituted BSCF membranes

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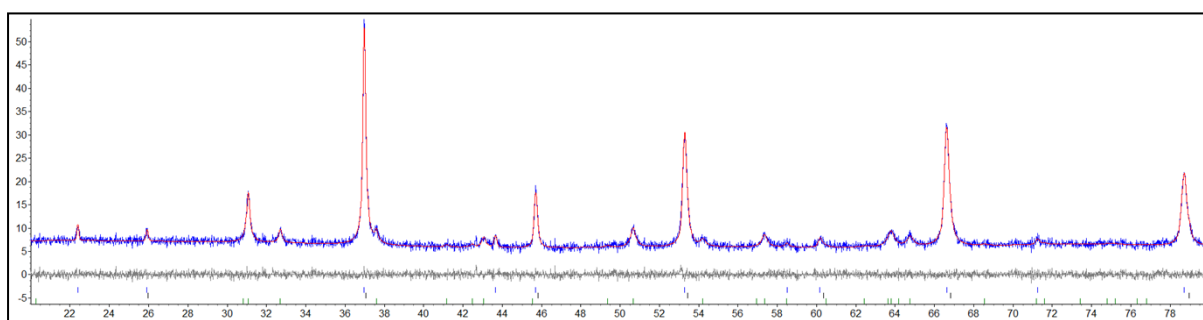
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S1: Pawley refinement (red line) of XRD data for $\text{Ba}_{0.5}\text{Sr}_{0.5}\text{Co}_{0.5}\text{Fe}_{0.125}\text{Mo}_{0.375}\text{O}_{3-\delta}$ powders (black line) sintered at 1200 °C for 5 hours. Reflection marks refer to SP (black), DP (blue) and BaMoO_4 (green $a = \text{Å}$). The gray line represents the difference between calculated and measured data.

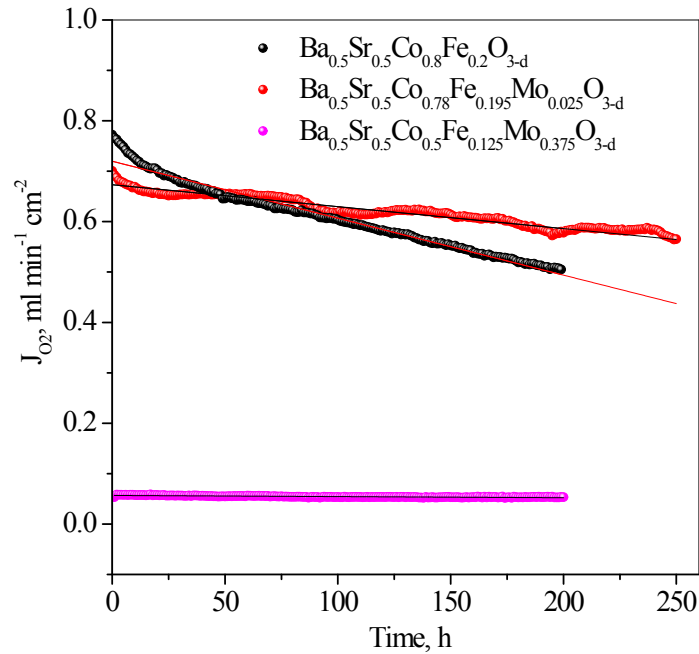
Lattice parameters		Refinement parameters	
Space group	$a, b, c / \text{Å}$	$R_{\text{wp}} / \%$	14.5
DP $Fm\bar{3}m$	$a=7.9857(3)$	$R_{\text{exp}} / \%$	13.6
SP $Pm\bar{3}m$	$a=3.9787(5)$	χ^2	1.06
$\text{BaMoO}_4 I41/a$	$a=5.5465(7) c=12.7643(9)$		



S2: Pawley refinement (red line) of XRD data for $\text{Ba}_{0.5}\text{Sr}_{0.5}\text{Co}_{0.5}\text{Fe}_{0.125}\text{Mo}_{0.375}\text{O}_{3-\delta}$ powders (blue line) sintered at 1250°C for 5 hours. Reflection marks refer to SP (black), DP (blue) and

BaMoO₄ (green). The gray line represents the difference between calculated and measured data.

Lattice parameters		Refinement parameters	
Space group	a, b, c / Å	R _{wp} / %	13.0
DP <i>Fm</i> $\bar{3}$ <i>m</i>	a=7.9798(2)	R _{exp} / %	12.0
SP <i>Pm</i> $\bar{3}$ <i>m</i>	a=3.9793(7)	χ^2	1.07
BaMoO ₄ <i>I41/a</i>	a=5.5532(8) c=12.7096(1)		



S3: Time dependence of oxygen permeation flux at 750 °C in 100/100 ml/min air/He for 1 mm BSCF, $Ba_{0.5}Sr_{0.5}Co_{0.78}Fe_{0.195}Mo_{0.025}O_{3-d}$ and $Ba_{0.5}Sr_{0.5}Co_{0.5}Fe_{0.125}Mo_{0.375}O_{3-d}$ membranes. $Ba_{0.5}Sr_{0.5}Co_{0.78}Fe_{0.195}Mo_{0.025}O_{3-d}$ membrane was tested for additional 50 hours and is compared with BSCF (experimental data are extrapolated to 250 hours).