

**Ameliorating $\text{La}_{0.5}\text{Sr}_{1.5}\text{MnO}_4$ with Ni-doping to enhance cathode electrocatalysis
for proton-conducting solid oxide fuel cells**

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Table S1 The lattice spacing (d_{hkl}) of LSMN and LSMO based on the Rietveld refinement results shown in Fig. 1(a) and Fig. 1(b).

Lattice Planes (hkl)	LSMO		LSMN	
	2 Theta	d-hkl	2 Theta	d-hkl
101	3.68145	24.12	3.6568	24.221
004	3.10336	28.708	3.11586	28.526
103	2.82054	31.662	2.81402	31.674
110	2.72581	32.794	2.70479	32.993
112	2.49574	35.919	2.48116	36.074
105	2.08726	43.277	2.0884	43.188
006	2.06891	43.681	2.07724	43.433
114	2.04799	44.151	2.04256	44.211
200	1.92744	47.076	1.91257	47.4
202	1.84073	49.44	1.8284	49.732
211	1.70757	53.592	1.69477	53.966
116	1.64797	55.697	1.64746	55.651
204	1.63734	56.09	1.63	56.302
107	1.61105	57.089	1.61419	56.904
213	1.59136	57.863	1.58181	58.182
008	1.55168	59.49	1.55793	59.163
215	1.41604	65.872	1.41046	66.102
206	1.41027	66.176	1.40701	66.285
220	1.36291	68.792	1.35239	69.339
118	1.3485	69.633	1.35	69.48
222	1.33119	70.673	1.32163	71.198
109	1.29865	72.723	1.30212	72.434
301	1.27813	74.084	1.26843	74.684
224	1.24787	76.198	1.24635	76.244
0010	1.24134	76.671	1.24058	76.663
217	1.23611	77.055	1.23357	77.18
303	1.22715	77.724	1.21893	78.284
310	1.21902	78.341	1.20962	79.005
208	1.20868	79.143	1.20791	79.139