Support information

CO_2-tolerant oxygen permeation membranes containing transition metals as sintering aids with high oxygen permeability

Xiaopeng Wang[1,#], Lei Shi[1,#], Yanhao Huang[1], Lingyong Zeng[1], Mebrouka Boubeche[1], Dongcheng Li[1], Huixia Luo[1,2,3,4,*]

[1] School of Materials Science and Engineering, Sun Yat-Sen University, No. 135, Xingang Xi Road, Guangzhou, 510275, P. R. China

[2] State Key Laboratory of Optoelectronic Materials and Technologies, No. 135, Xingang Xi Road, Guangzhou, 510275, P. R. China

[3] Key Lab of Polymer Composite & Functional Materials, Sun Yat-Sen University, No. 135, Xingang Xi Road, Guangzhou, 510275, P. R. China

[4] Guangzhou Key Laboratory of Flexible Electronic Materials and Wearable Devices, Sun Yat-Sen University, No. 135, Xingang Xi Road, Guangzhou, 510275, P. R. China

[#] These authors contributed equally to this work

[*] Correspondence: luohx7@mail.sysu.edu.cn; Tel.: (+0086)020-39386124

Table S1 the relative density of CPM-PSFA (M = Fe, Co, Ni, Cu) composite membranes after sintering at 1275 ℃.

	Theoretical density (g/cm^3)	**Volume density (g/cm^3)**	**Relative density**	**Porosity**
M = Ni	6.22	5.48	0.88	0.12
M = Co	6.22	6.15	0.99	0.01
M = Cu	6.23	5.08	0.82	0.18
M = Fe	6.22	5.35	0.86	0.14

Table S2 the average grain size of CPM-PSFA (M = Fe, Co, Ni, Cu) composite membranes after sintering at 1275 ℃ for 5 h.

	CPFe- PSFA	CPCo-PSFA	CPNi-PSFA	CPCu-PSFA
CPM	1.01 μm	1.11 μm	0.94 μm	3.90 μm
PSFA	1.01 μm	1.22 μm	1.04 μm	3.45 μm

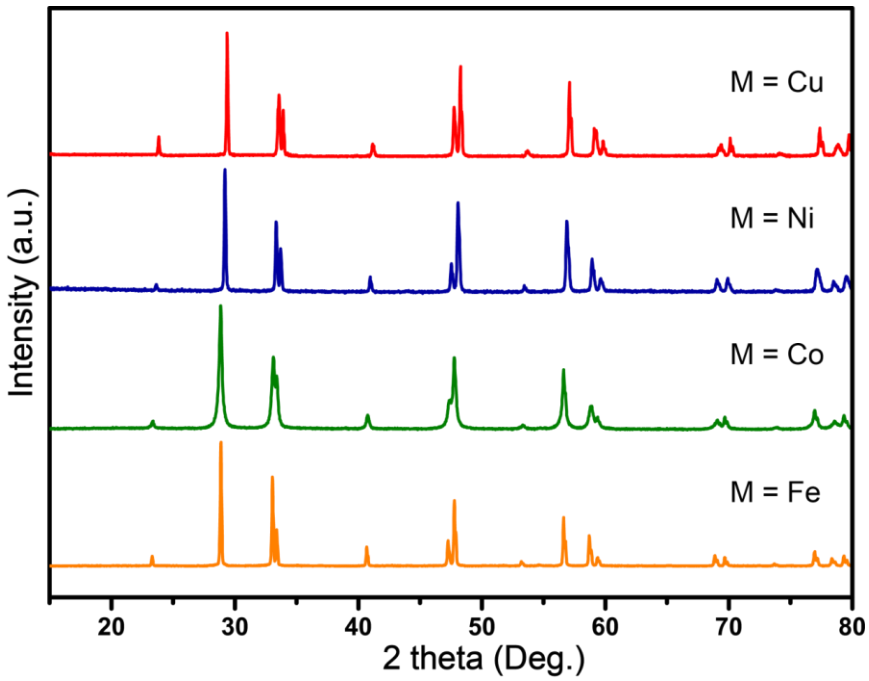

Figure S1. XRD patterns of CPM-PSFA (M = Fe, Co, Ni, Cu) membranes after sintering at 1275 ºC for 5 h.

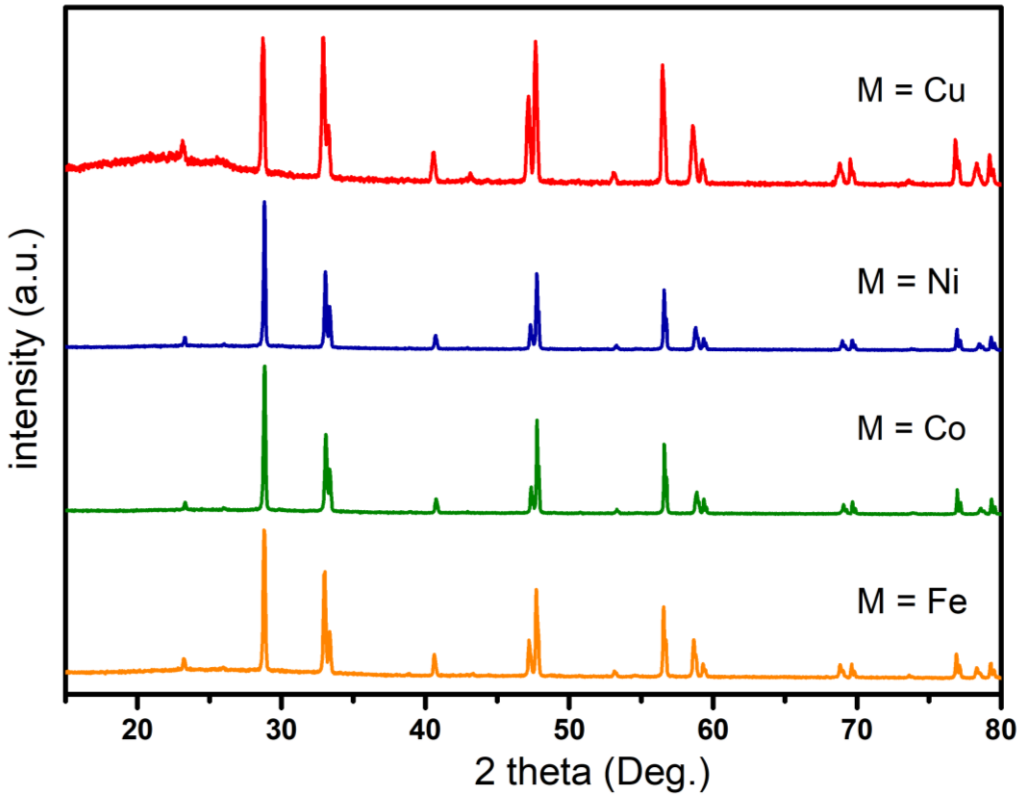

Figure S2. XRD patterns of CPM-PSFA (M = Fe, Co, Ni, Cu) membranes after sintering at 1350 ºC for 5 h.

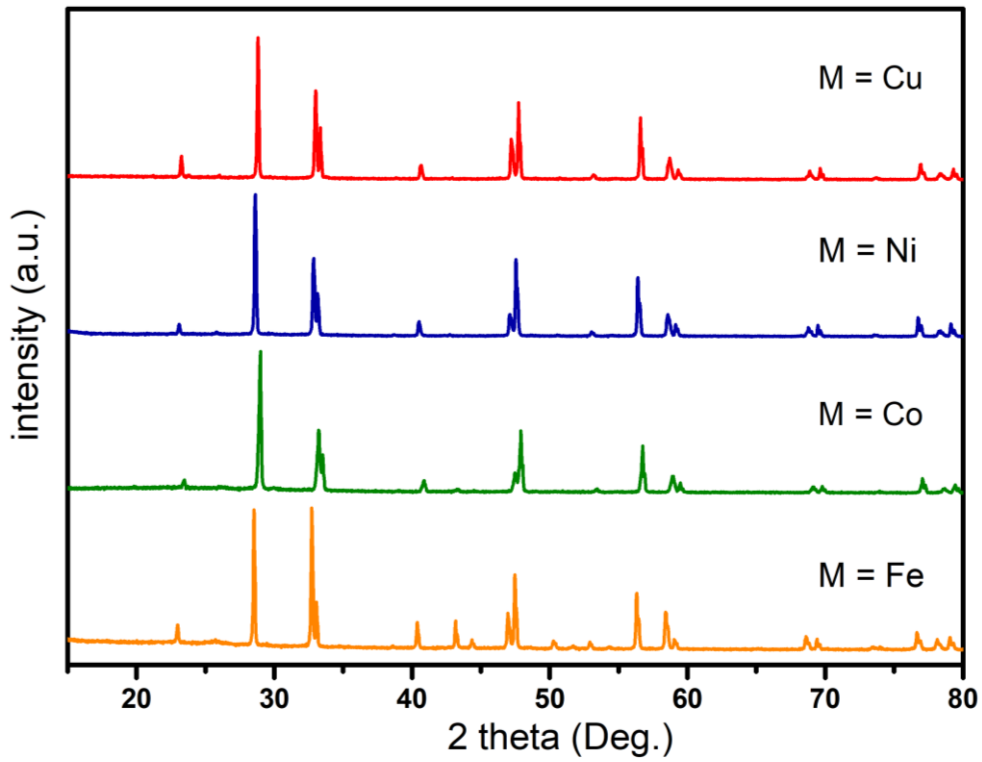

Figure S3. XRD patterns of CPM-PSFA (M = Fe, Co, Ni, Cu) membranes after sintering at 1400 ºC for 5 h.

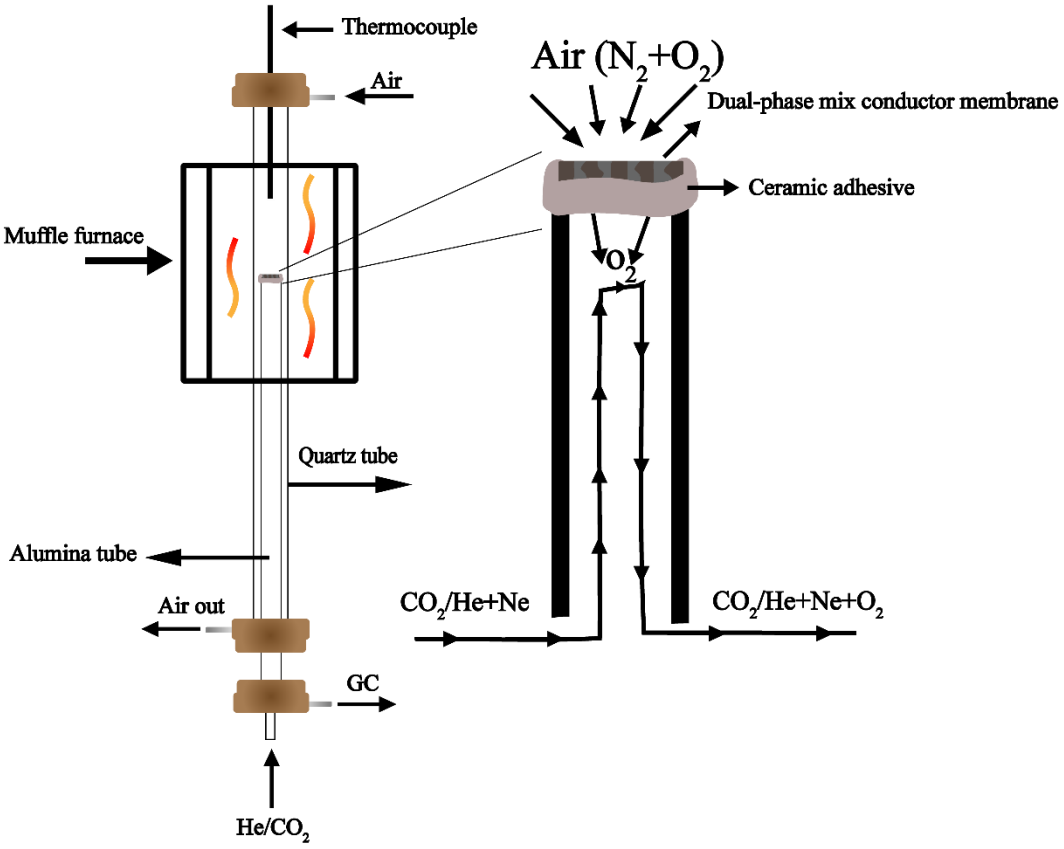

Figure S4 Schematic diagram of oxygen permeability test device.

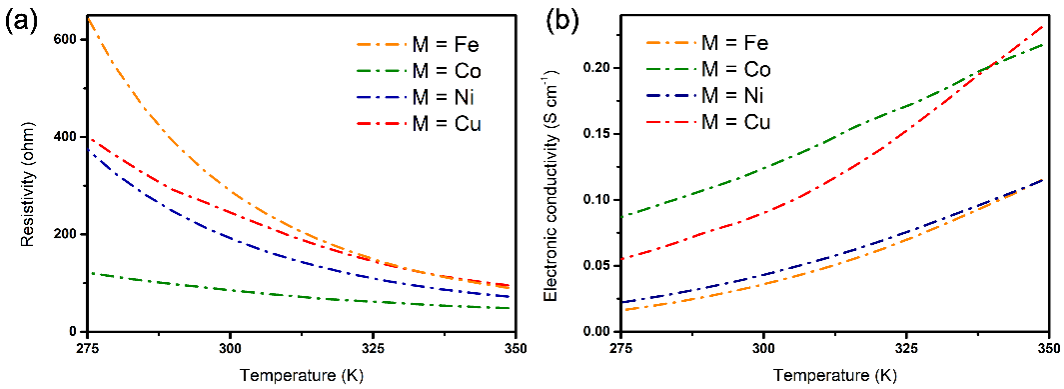

Figure S5 (a) The temperature dependence of resistivity of the CPM-PSFA (M = Fe, Co, Ni, Cu) in the 275K-350K. (b) temperature dependence of conductivity of CPM-PSFA (M = Fe, Co, Ni, Cu) in the 275 K-350 K.