Journal Name

ARTICLE

Supporting information

A Novel Dual Phase Membrane 40wt.%$Nd_{0.6}Sr_{0.4}CoO_{3-\delta}$ - 60wt.%$Ce_{0.9}Nd_{0.1}O_{2-\delta}$: Design, Synthesis and Properties

Yuan He,[a] Lei Shi,[a] Fan Wu,[c] Weiwei Xie,[d] Shu Wang,[a] Dong Yan,[a] Peijiang Liu,[a] Man-Rong Li,[e] Jürgen Caro,[e*] Huixia Luo[a, e*]

[a]*School of Materials Science and Engineering, Key Laboratory for Polymeric Composite and Functional Materials of Ministry of Education, Sun Yat-Sen University, No. 135, Xingang Xi Road, Guangzhou, 510275, P. R. China*

Email: luohx7@mail.sysu.edu.cn

[b]*Harvard John A. Paulson School of Engineering and Applied Sciences, Harvard University, 410 Gordon McKay Laboratory of Applied Science, 9 Oxford St. Cambridge, MA 02138, USA*

[c]*Department of Chemistry, Louisiana State University, Baton Rouge, Louisiana 70803-1804, USA*

[d]*MOE* Key Laboratory of Bioinorganic and Synthetic Chemistry, *School of Chemistry, Sun Yat-Sen University, No. 135, Xingang Xi Road, Guangzhou, 510275, P. R. China*

[e]*Institute of Physical Chemistry and Electrochemistry, Leibniz University of Hannover, Callinstr. 3A, D-30167 Hannover, Germany*

Email: juergen.caro@pci.uni-hannover.de

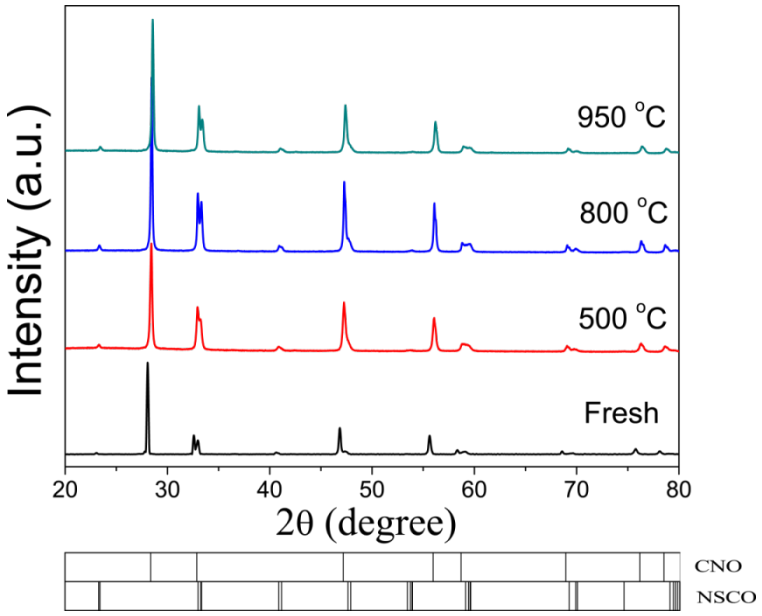

Fig. 1S. XRD patterns of the 40NSCO-60CNO powder before and after exposure to pure Ar (99.999%) at different temperatures for 48 h.

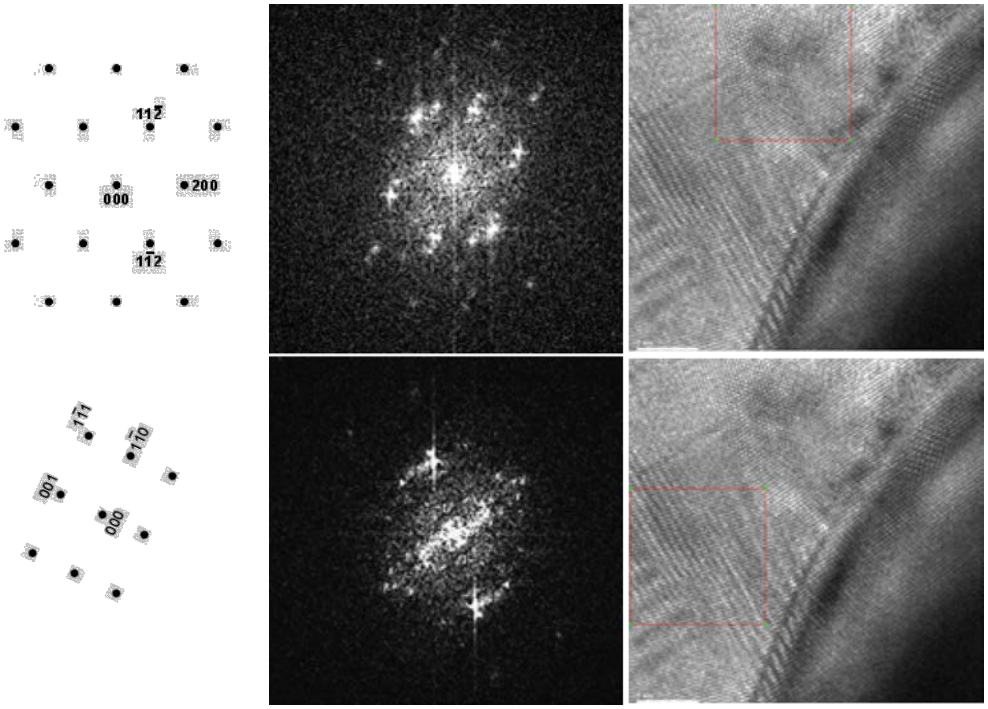

Fig. 2S Fast Fourier Transformation images of different selected areas in the 40NSCO-60CNO powder after calcined at 950 ^{o}C for 10 h in air. The top one shows the [021] Zone axis pattern (ZAP) of $Nd_{0.6}Sr_{0.4}CoO_3$, which has an orthorombic structure. The bottom one shows the [110] Zone axis pattern (ZAP) of $Ce_{0.9}Nd_{0.1}O_2$, which has a cubic structure.

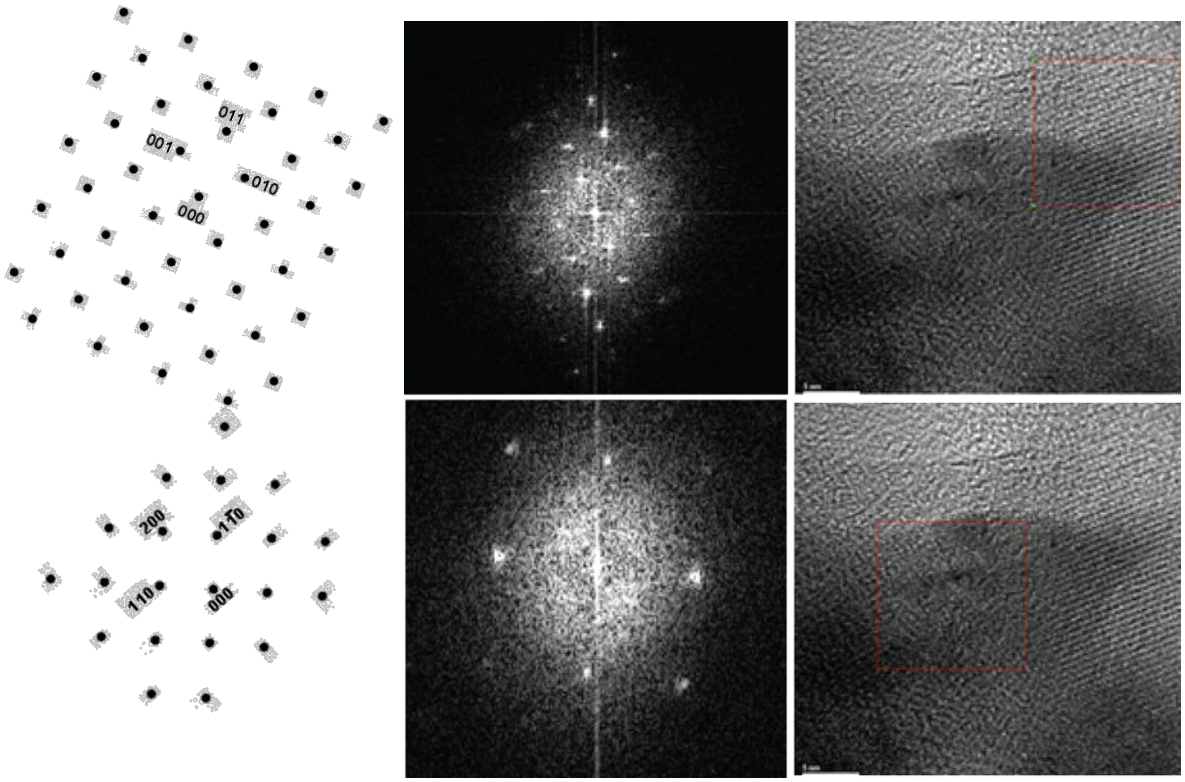

Fig. 3S Fast Fourier Transformation images of different selected areas in the 40NSCO-60CNO membrane after sintered at 1225 ^{o}C for 5 h in air after crashed. The top one shows the [100] Zone axis pattern (ZAP) of $Ce_{0.9}Nd_{0.1}O_2$, which has a cubic structure. The bottom one shows the [001] Zone axis pattern (ZAP) of $Nd_{0.6}Sr_{0.4}CoO_3$, which has an orthorombic structure