Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.
This journal is © The Royal Society of Chemistry 2021

Identical Cut-off Voltage versus Equivalent Capacity: An Objective Evaluation on Impact of Dopants in Layered Oxide Cathodes

Kai Zhou[1,2], Ziyao Gao[1], Xianming Deng[1], Cuiping Han,[3,*] Yongzhu Fu,[4] Shichao Zhang[1], Feiyu Kang[1], Baohua Li[1,*]

1. Shenzhen Key Laboratory on Power Battery Safety Research and Shenzhen Geim Graphene Center, Tsinghua Shenzhen International Graduate School, Tsinghua University, Shenzhen, 518055 China

2. School of Materials Science and Engineering, Tsinghua University, Beijing 100084, P. R. China.

Email: libh@mail.sz.tsinghua.edu.cn (B. Li)

3. Department of Materials Science and Engineering, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon, Hong Kong 999077, China.

Email: cuipihan@cityu.edu.hk (C. Han)

4. College of Chemistry, Zhengzhou University, Zhengzhou 450001, P. R. China

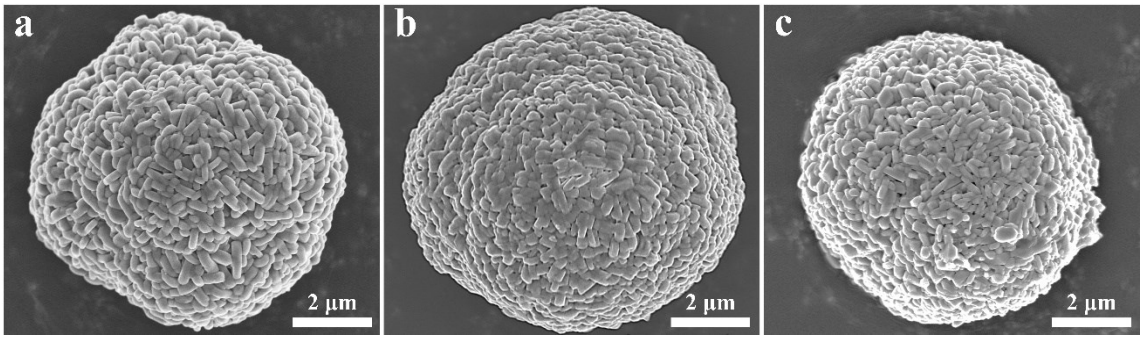

Figure S1. The morphologies of (a) LNO, (b) NC9406, and (c) NA9406.

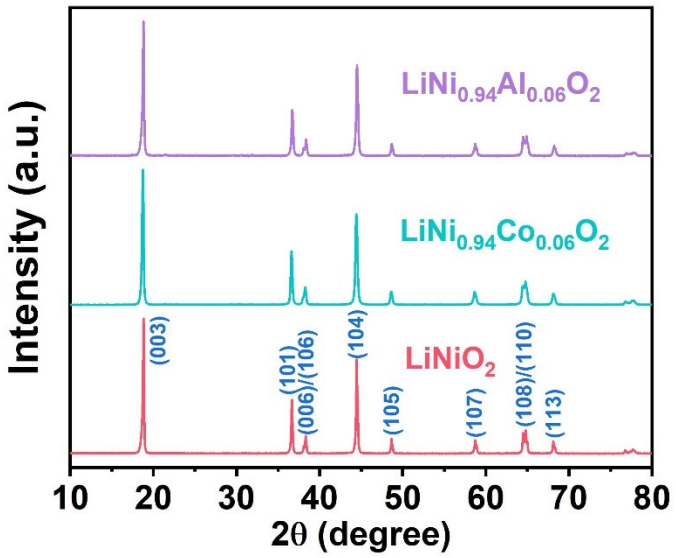

Figure S2. Characterization of the fresh high-nickel cathodes. XRD patterns of LNO, NC9406, and NA9406 cathodes.

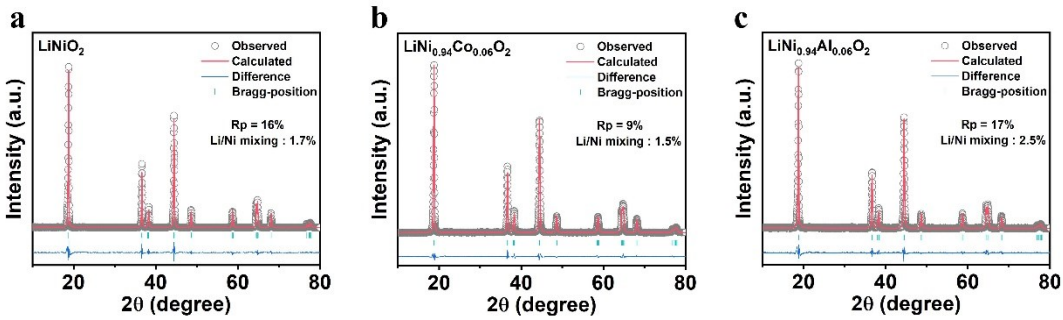

Figure S3. Rietveld refinement results of the XRD patterns of (a) LNO, (b) NC9406, and (c) NA9406.

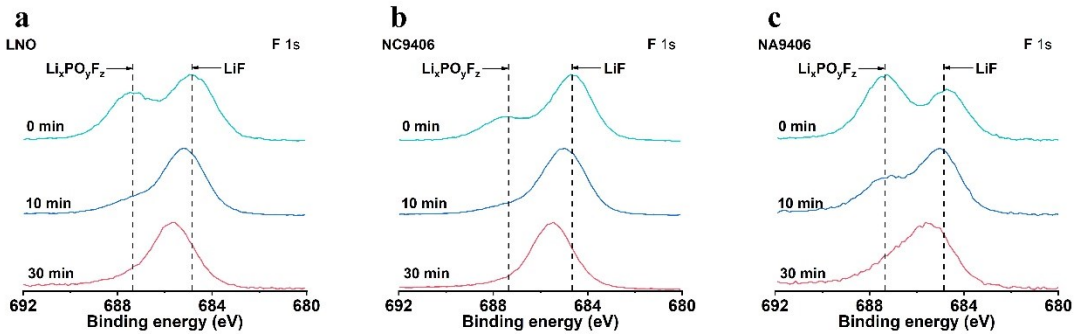

Figure S4. Characterization of components of SEI coated on the LNO, NC9406, and NA9406 cycled by charging to the equivalent capacity for 100 cycles. XPS F 1s spectra evolution along depth of (a) LNO, (b) NC9406, and (c) NA9406 by sputtering.

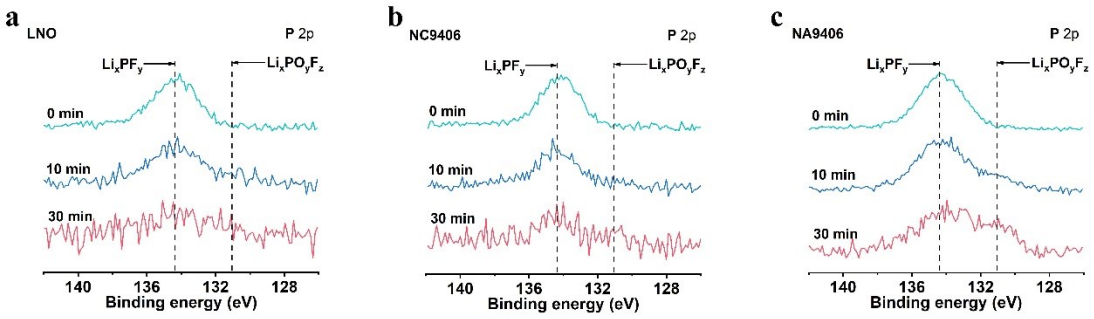

Figure S5. Characterization of components of SEI coated on the LNO, NC9406, and NA9406 cycled by charging to the equivalent capacity for 100 cycles. XPS P 2p spectra evolution along depth of (a) LNO, (b) NC9406, and (c) NA9406 by sputtering.

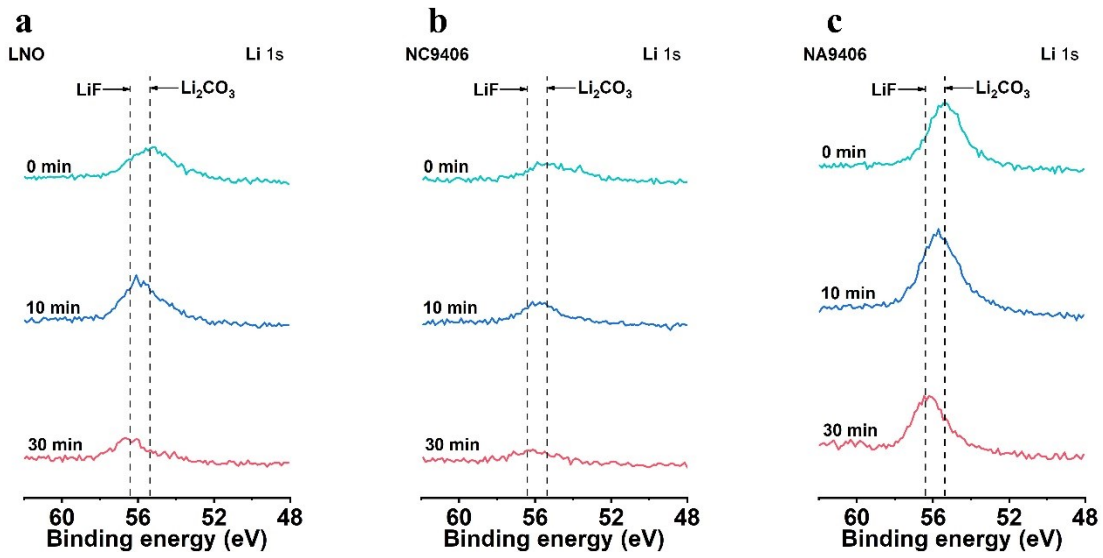

Figure S6. Characterization of components of SEI coated on the LNO, NC9406, and NA9406 cycled by charging to the equivalent capacity for 100 cycles. XPS Li 1s spectra evolution along depth of (a) LNO, (b) NC9406, and (c) NA9406 by sputtering.

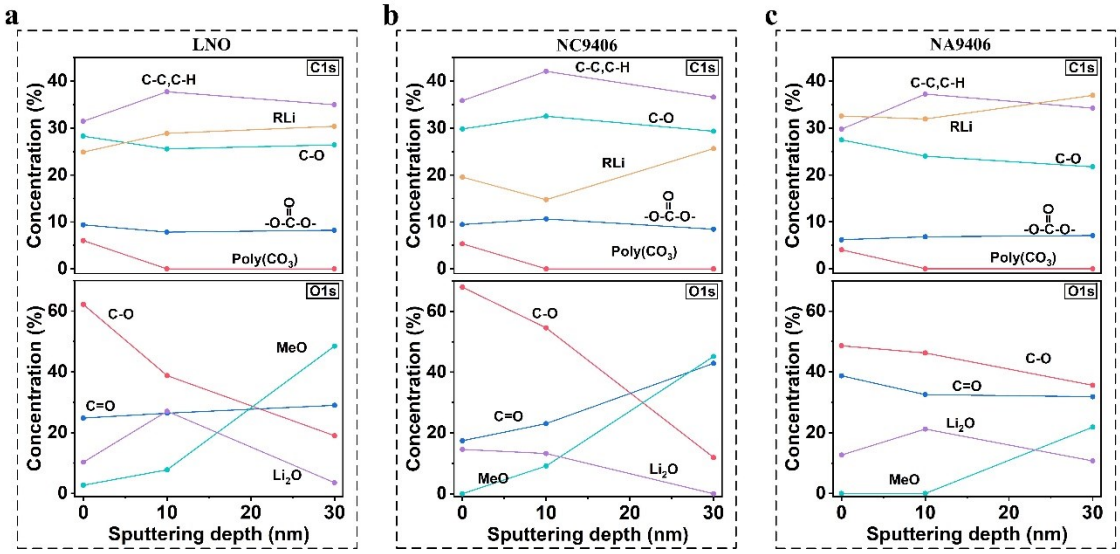

Figure S7. The content evolution of the detected species along depth for LNO, NC9406, and NA9406 in (a) C 1s and (b) O 1s.

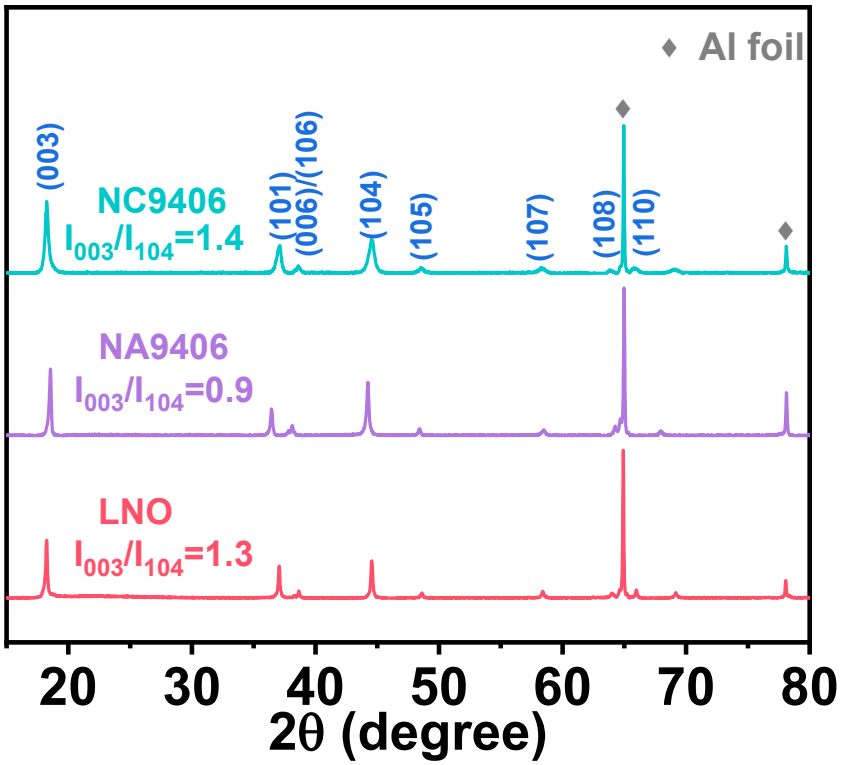

Figure S8. The XRD patterns of the cathodes after 100 cycles

Sample	*a (Å)*	*c (Å)*	(003)/(104)	Li/Ni mixing (%)	Rp (%)	Chi^2
LNO	2.8760	14.1845	1.26	1.7	16	6.1
NC9406	2.8745	14.1891	1.23	1.5	9	4.2
NA9406	2.8728	14.1990	1.21	2.5	17	2.7

Table S1. Crystallographic data of fresh cathodes acquired from Rietveld refinement