Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Tailoring Atomic Distribution in Micron-sized and Spherical Li-rich Layered Oxides as Cathode Materials for Advanced Lithium-ion Batteries

*Peiyu Hou, Guoran Li, Xueping Gao**

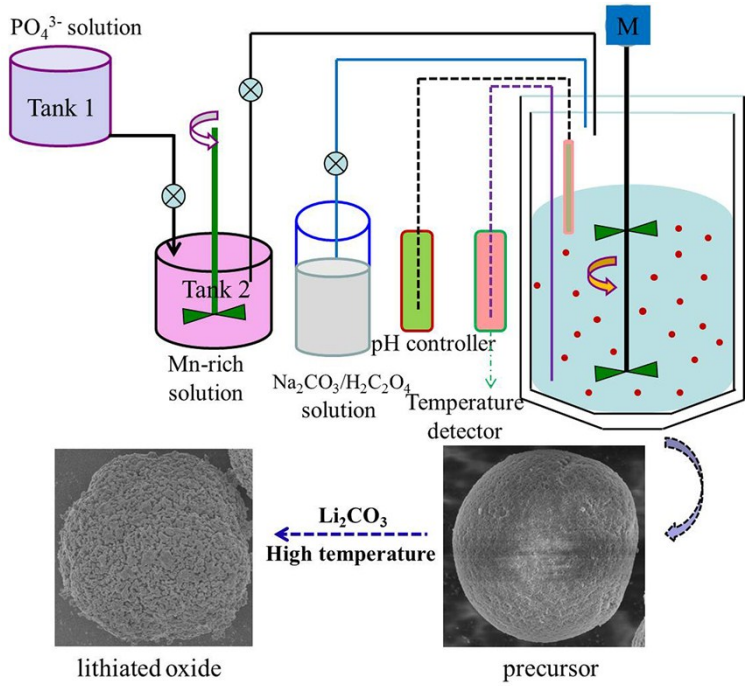

Fig. S1 Schematic diagram of the CSTR in preparing the CG-PO_4^{3-} doped carbonate precursors and lithiated oxides; Tank 2: Ni/Co/Mn=1/1/4, Tank 1: PO_4^{3-} solution.

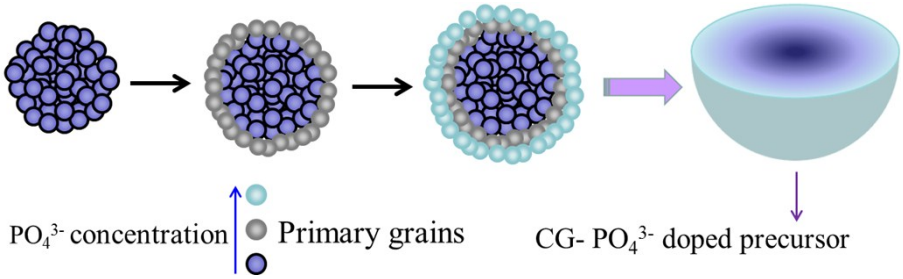

Fig. S2 The detailed formation mechanism of concentration-gradient PO_4^{3-} doped precursors during co-precipitation process in CSTR.

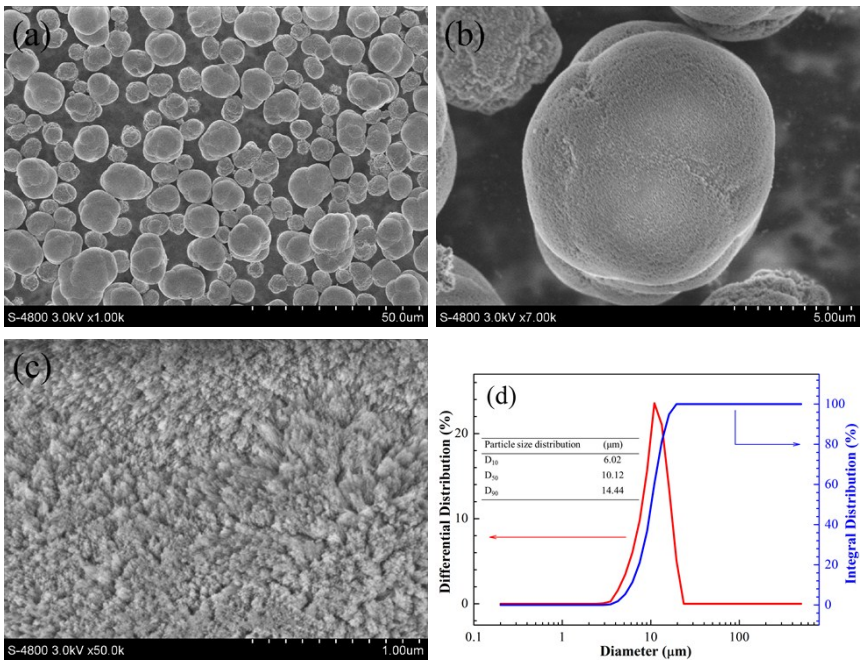

Fig. S3 SEM images (a-c) and particle size distribution (d) of the normal carbonate precursors.

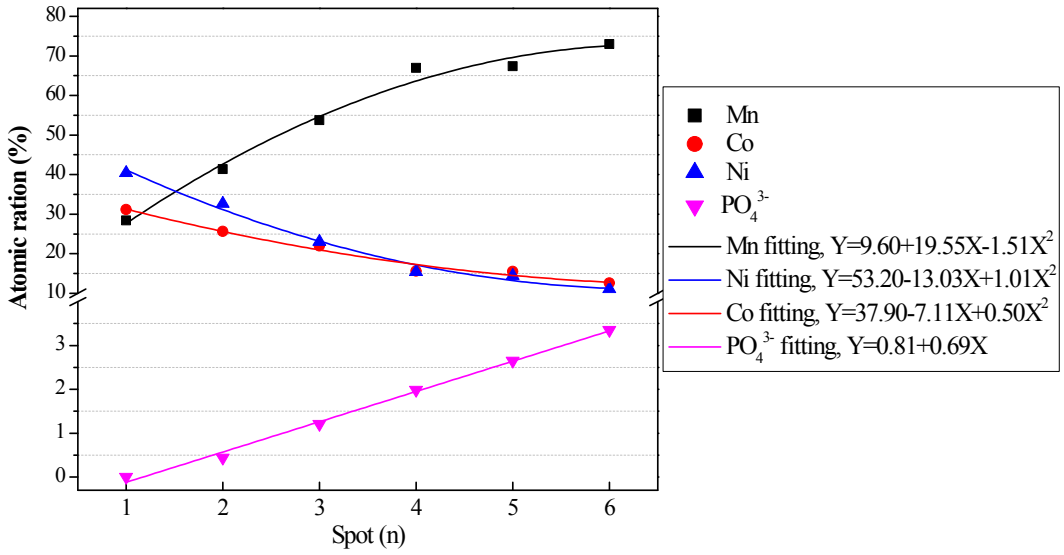

Fig. S4 The spot scanning EDS results on the cross-section of a single CG-PO_4^{3-} doped precursor particle and the fitting results.

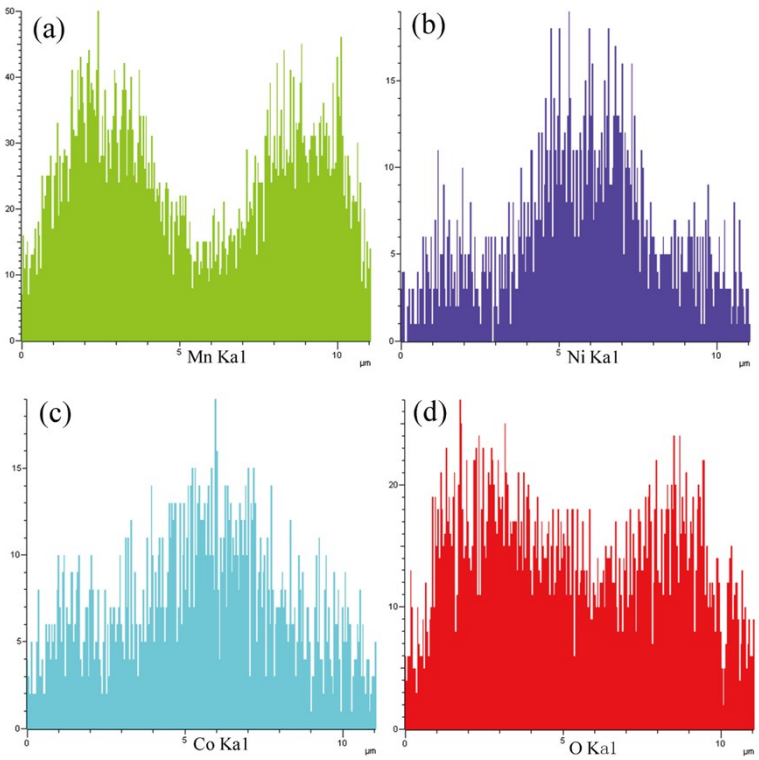

Fig. S5 Detailed linear scanning EDS results of Mn (a), Ni (b), Co (c) and O (d) compositional changes on the cross-section of a single CG-PO_4^{3-} doped precursor particle.

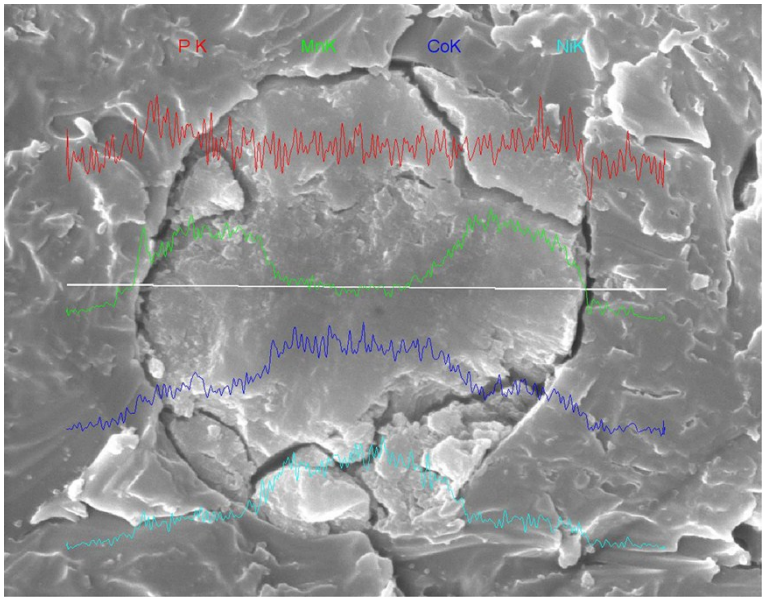

Fig. S6 Linear scanning EDS results of the compositional changes on the cross-section of a single CG-PO_4^{3-} doped carbonate precursor particle.

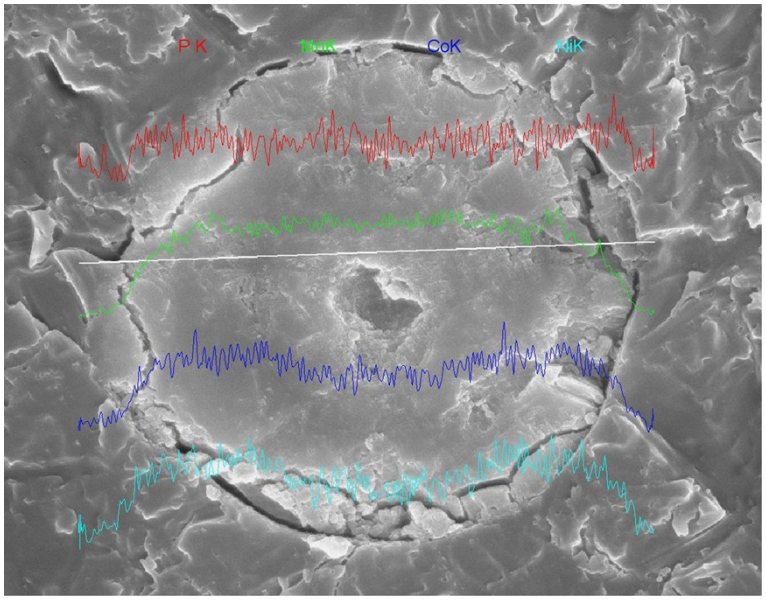

Fig. S7 Linear scanning EDS results of the compositional changes on the cross-section of a single normal carbonate precursor particle.

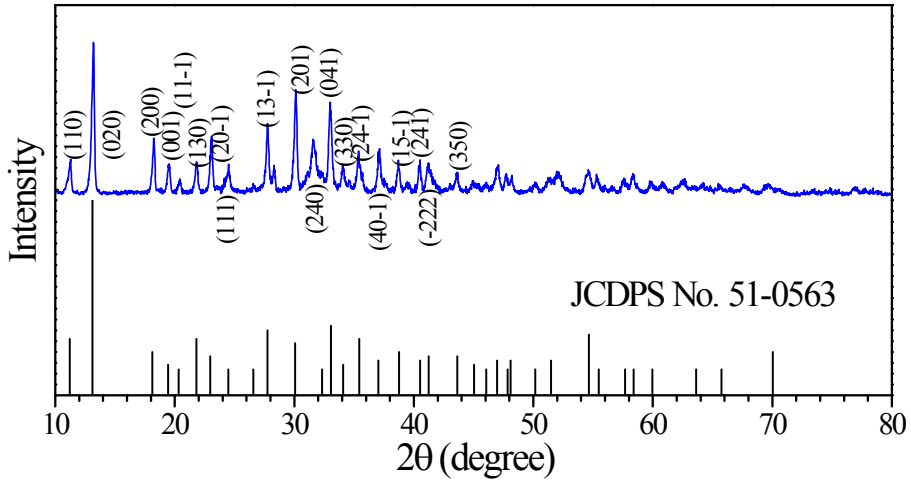

Fig. S8 XRD results of the new deposit achieved from the normal precursors $(Ni_{1/6}Co_{1/6}Mn_{4/6})CO_3$ in 0.1 M KH_2PO_4 solution after 36 h.

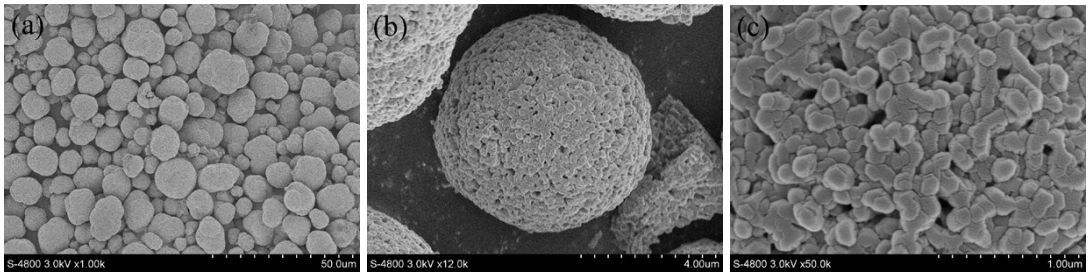

Fig. S9 SEM images of the normal Li-rich layered oxides.

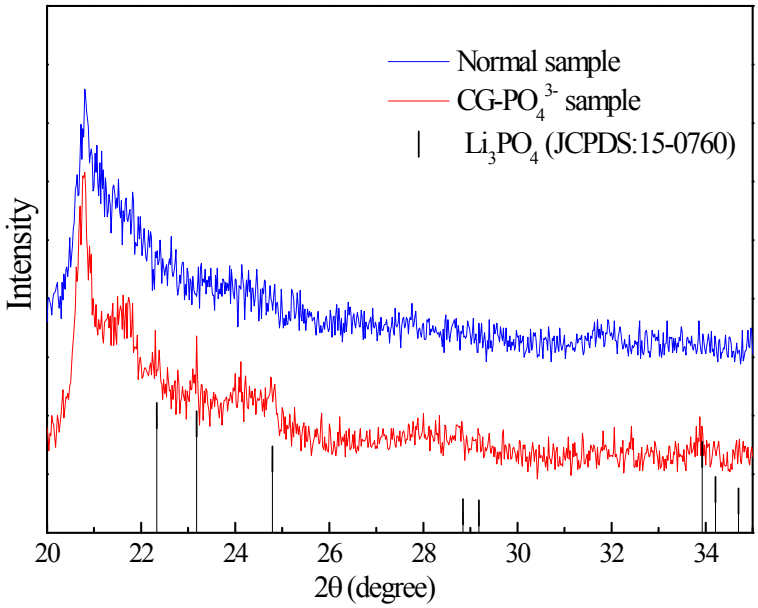

Fig. S10 Part XRD results of the normal and CG-PO_4^{3-} doped Li-rich layered oxides.

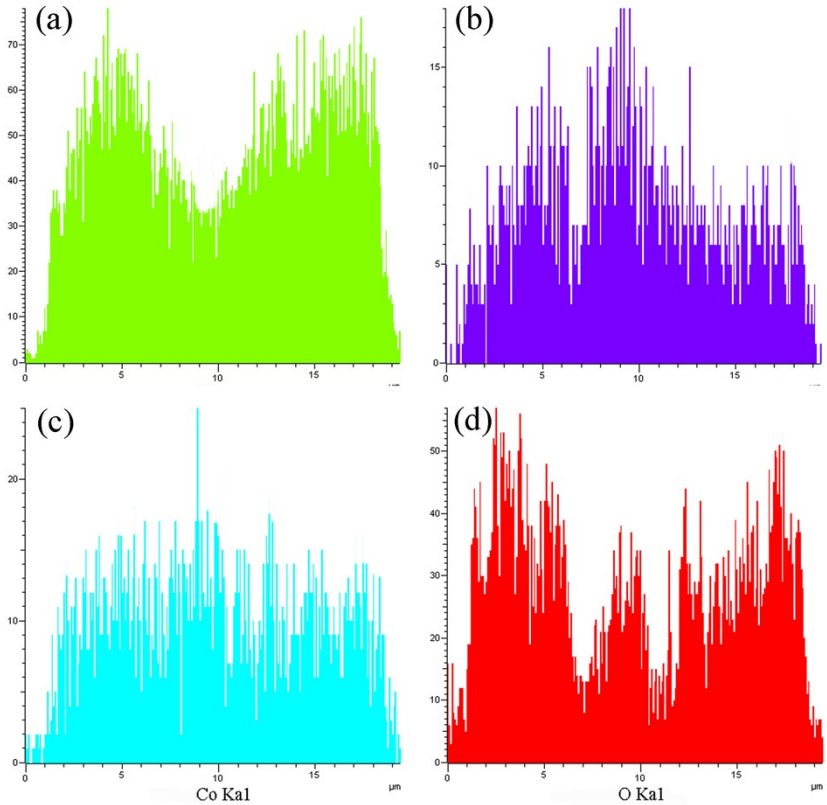

Fig. S11 Detailed linear scanning EDS results of Mn (a), Ni (b), Co (c) and O (d) compositional changes on the cross-section of a single CG-PO_4^{3-} doped Li-rich oxide particle.

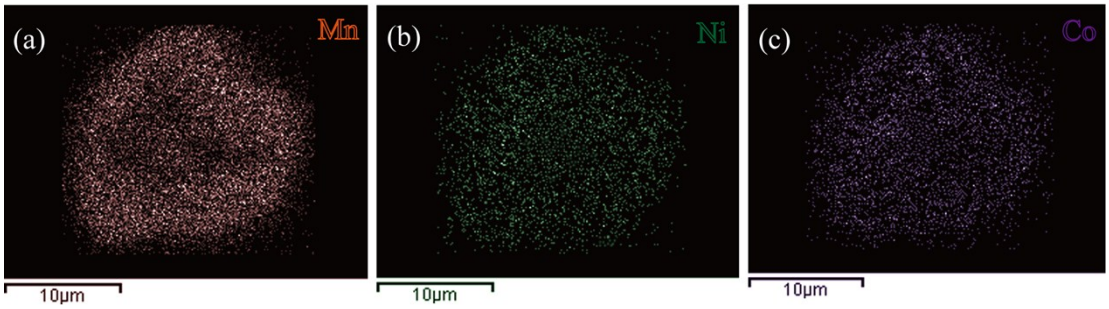

Fig. S12 The map scanning EDS results on the cross-section of a single CG-PO_4^{3-} doped Li-rich oxide particle.

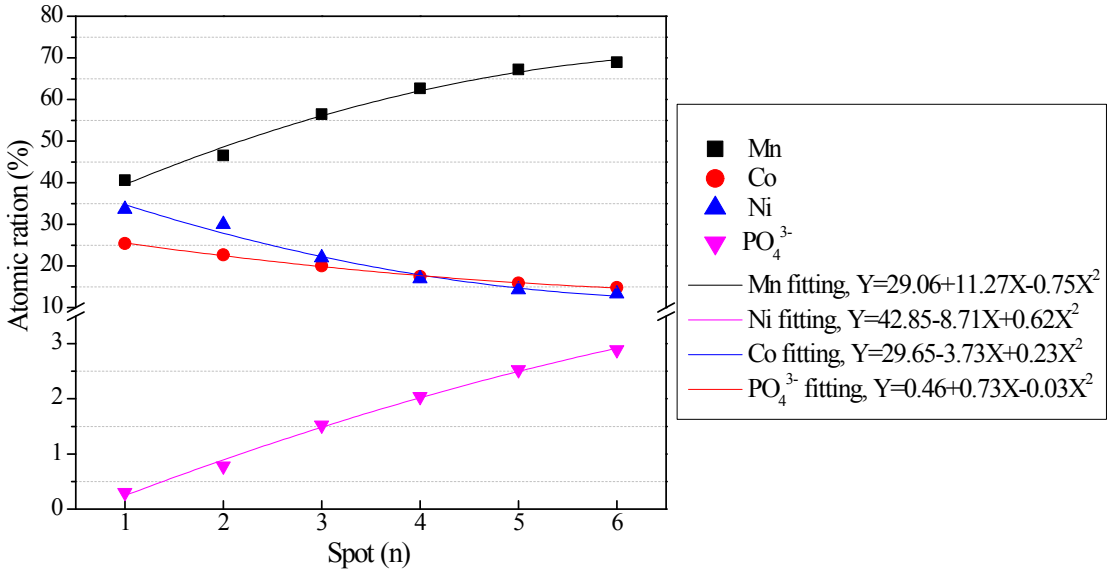

Fig. S13 The spot scanning EDS results on the cross-section of a single CG-PO_4^{3-} doped Li-rich oxide particle and the fitting results.

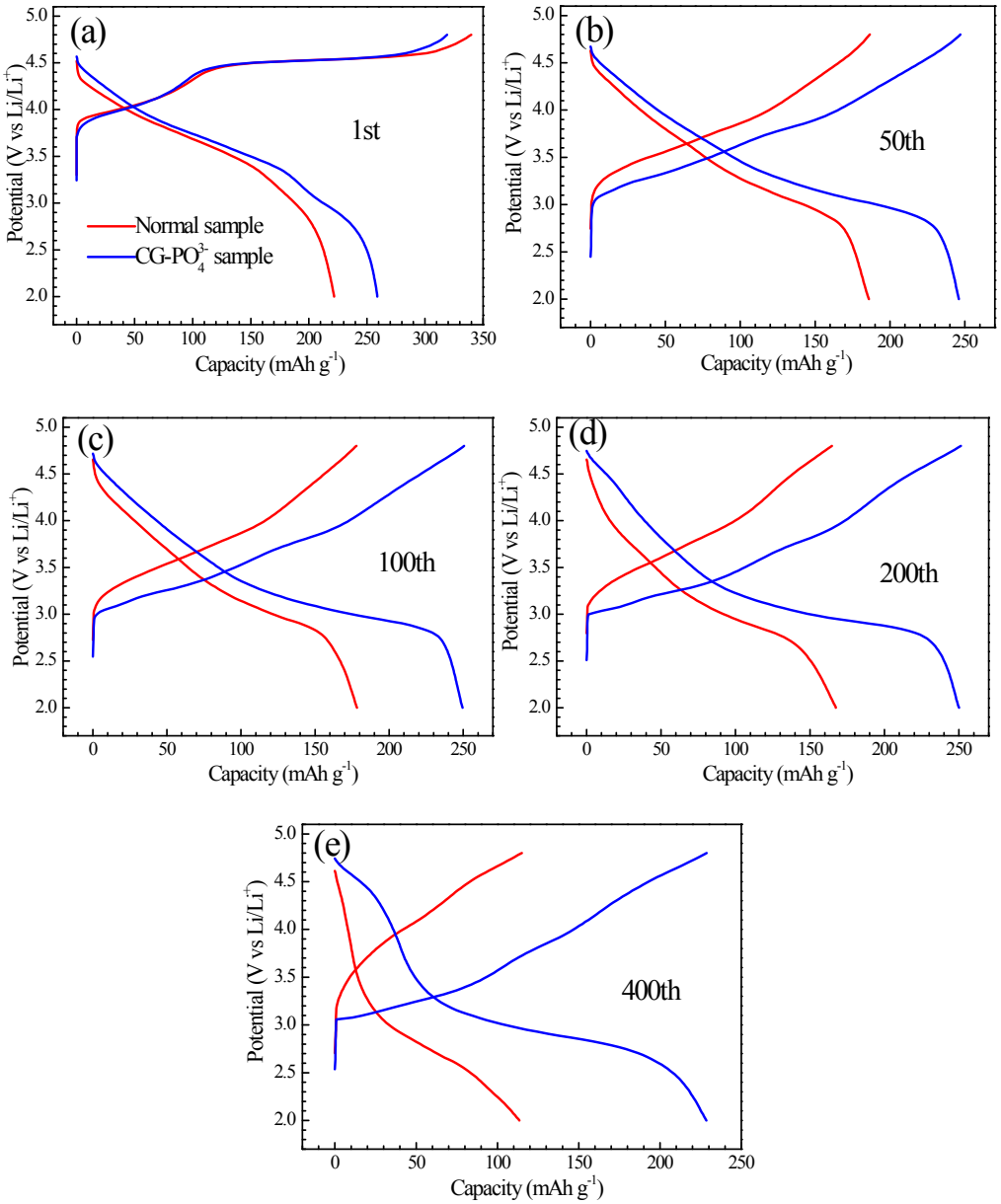

Fig. S14 The 1st, 50th, 100th, 200th and 400th charge-discharge curves of the normal and CG-PO_4^{3-} doped Li-rich layered oxides at current density of 100 mA g^{-1} and 25 °C.