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Improving the electrochemical performance of layered Li-rich transition-metal oxides by alleviating the blockade effect of surface lithium

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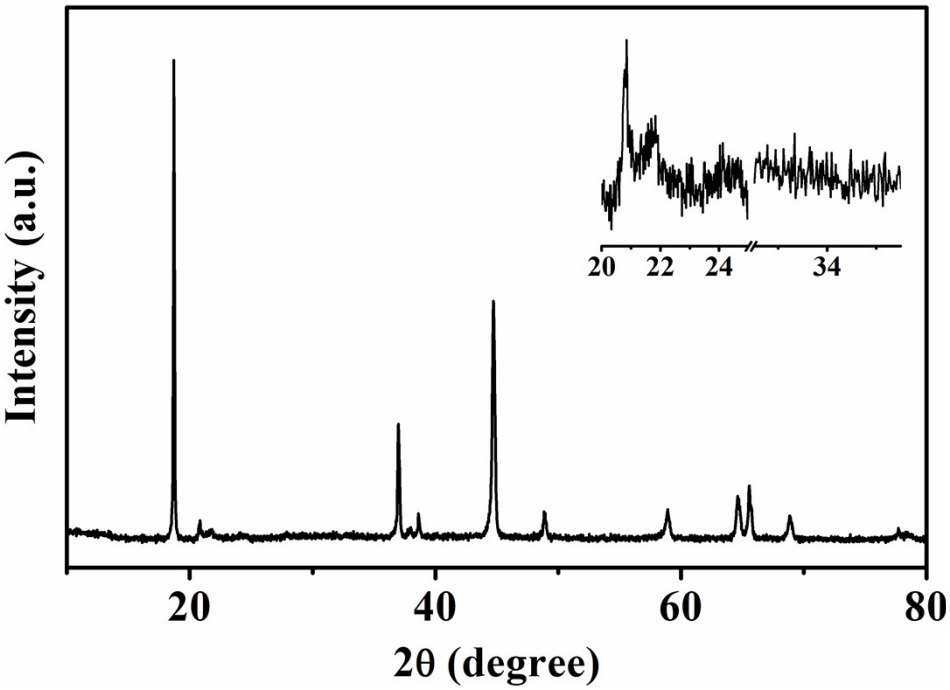

Figure S1. XRD pattern of the sample Sc.

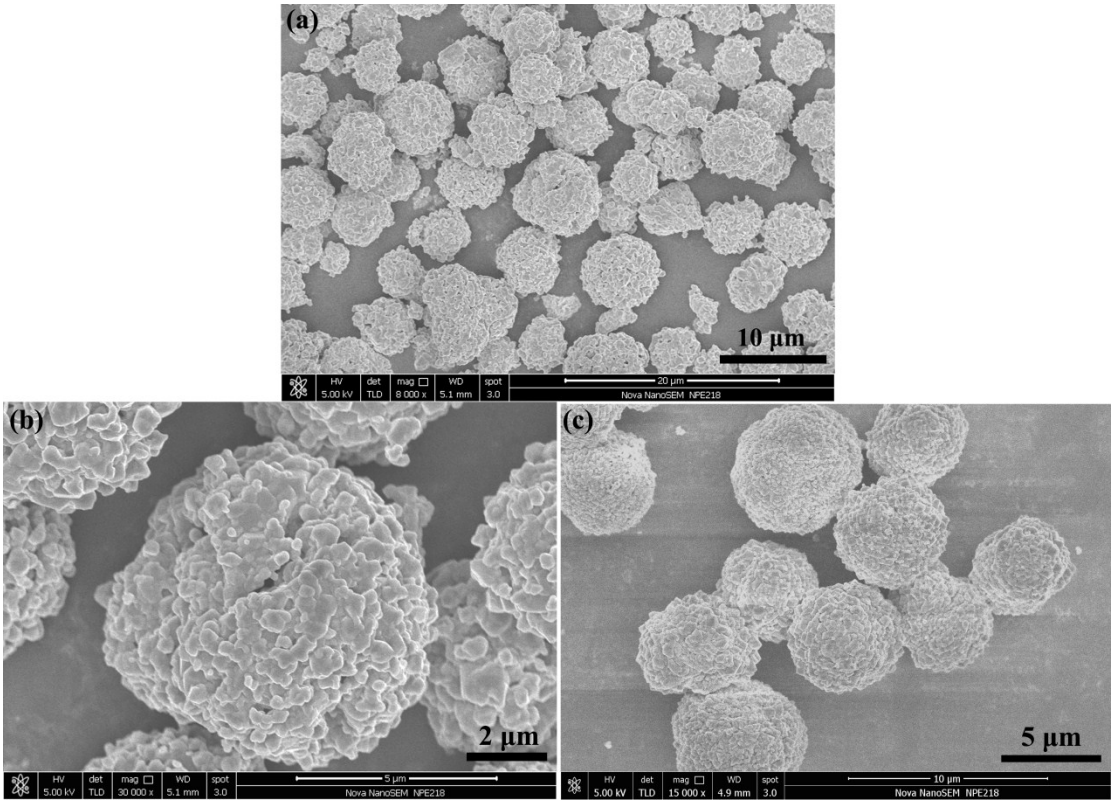

Figure S2. SEM images of (a,b) the sample Sc and (c) the precursor.

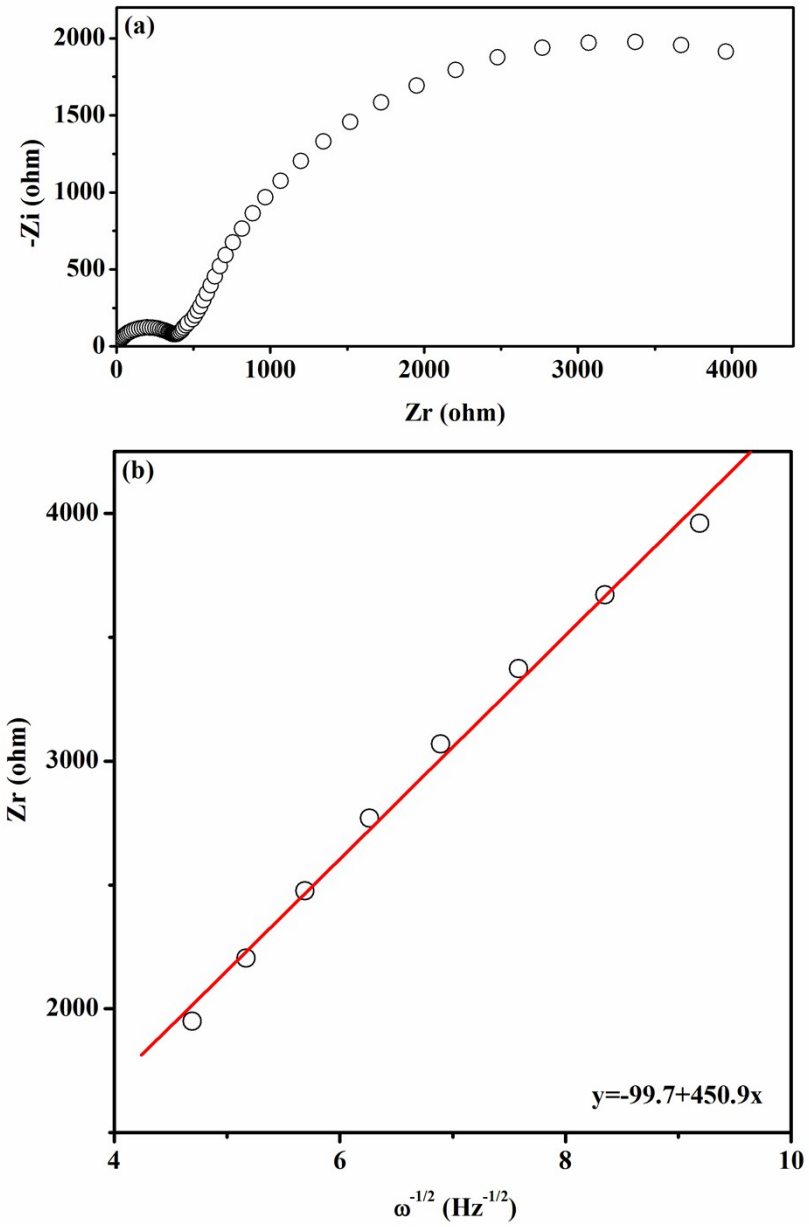

Figure S3. (a) Electrochemical impedance spectra of the half-cells charged to 4.8 V during the first cycle and (b) the profiles of Zr vs $\omega^{-1/2}$ from 0.1 Hz to 0.01 Hz for the sample Sc.

Table S1. Chemical composition analysis of the four samples

Samples	Li	Mn	Ni	Co
Sc	1.229	0.449	0.159	0.163
R2	1.231	0.460	0.152	0.157
R4	1.237	0.456	0.150	0.157
R6	1.238	0.454	0.151	0.157
Average	1.234	0.455	0.153	0.159

Table S2. The relative percentage of each peak for O 1s spectrum.

Sample	Relative percentages (%)		
	Peak I	Peak II	Peak III
Sc	61.0	33.8	5.2
R2	63.7	28.0	8.3
R4	52.0	36.5	11.5
R6	42.7	50.1	6.2

Based on the XPS spectra, the surface contents of metal elements are calculated by the below method. Firstly, we fitted the XPS spectra of metal elements by the software CasaXPS. Then, the strongest peaks in each XPS spectrum of metal elements of the same sample were meanwhile selected. And, using the function of quantitative analysis of the software CasaXPS, we obtained the quality percentage of surface metal elements and calculated out the stoichiometric ratio of surface metal elements. Finally, the change trend of surface relative content of lithium in the four samples was determined by comparing the value of surface Li/TM.