Supplementary Material

High performance Li-rich β -Li₂IrO₃ electrode for symmetric lithium ion

battery

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Figure S1. SEM images (a and b) and EDS elemental mapping of Ir (c) and O (d) of β -Li₂IrO₃.



Figure S2. SEM image (a) and EDS elemental mapping of Ir (b) and O (c) of β -Li₂IrO₃.



Figure S3. TEM images of single β -Li₂IrO₃ nanoparticle with different magnifications.





Figure S5. The *ex*-XRD patterns of LIO-cathode during first charging process.



Figure S6. The STEM images of LIO-cathode at different voltages during first charging-discharge process: charging to (a) 4.0 V, (b) 4.2 V, (c) 4.6 V and discharging to (d) 3.0 V.



Figure S7. The EIS result of β -Li₂IrO₃.



Figure S8. The peak intensity changes during the initial discharge-charge process.



Figure S9. The STEM images of LIO-anode (a) after first discharge at 0.1 V and (b) after the following charging process at 3.0 V.



Figure S10. The EIS result of the fresh LIO//LIO full cell.



Figure S11. The SEM image (a) and EDS elemental mapping (b, Ir and c, O) of LIO-cathode after cycling test in LIO//LIO full cell.



Figure S12. The SEM image (a) and EDS elemental mapping (b, Ir and c, O) of LIO-anode after cycling test in LIO//LIO full cell.