

## Supporting Information

# Heterostructure Fe<sub>2</sub>O<sub>3</sub> nanorods@imine-based covalent organic framework for long-cycling and high-rate lithium storage

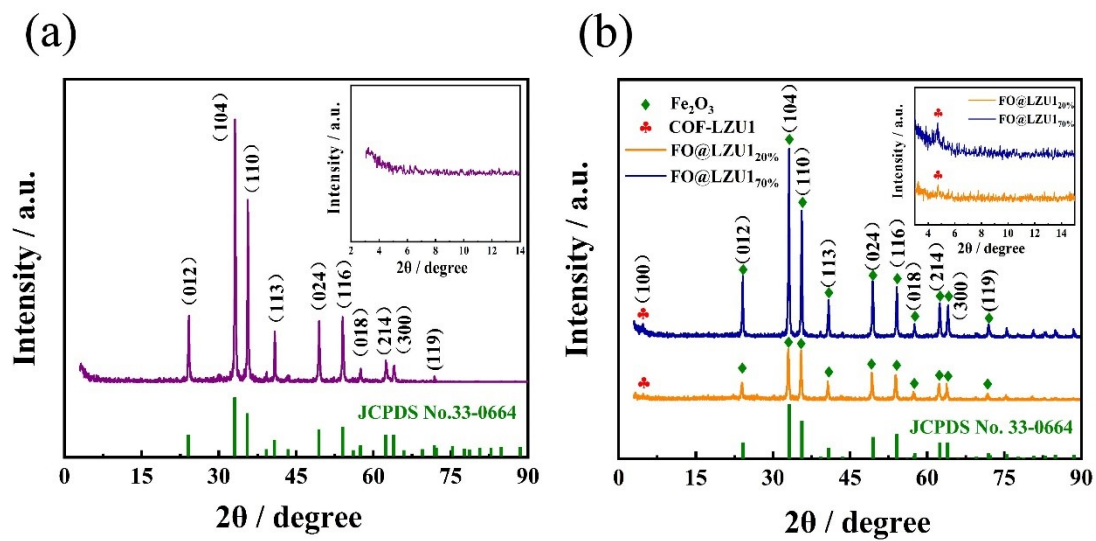
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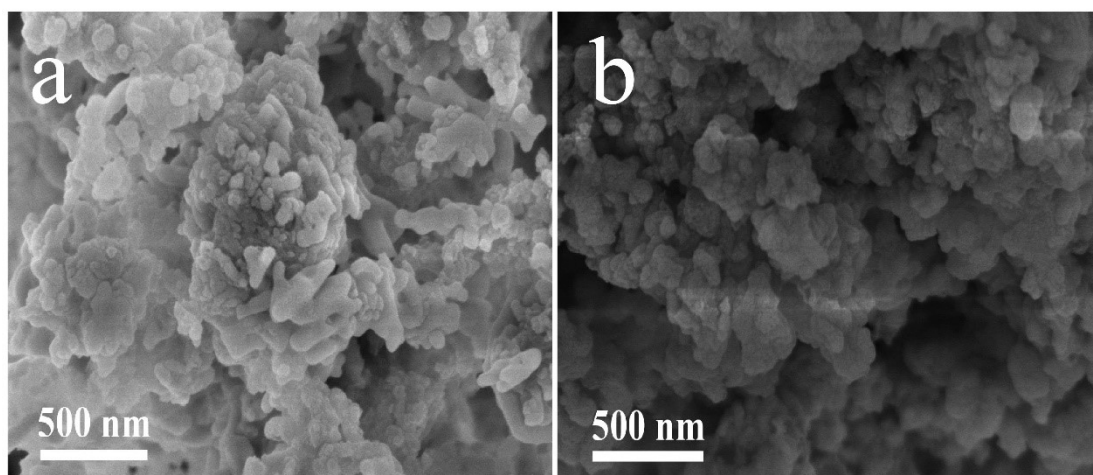
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**Fig. S1** XRD patterns of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> (a) and FO@LZU<sub>120%</sub>, FO@LZU<sub>170%</sub> (b).



**Fig. S2** SEM images of FO@LZU<sub>120%</sub> (a) and FO@LZU<sub>170%</sub> (b).

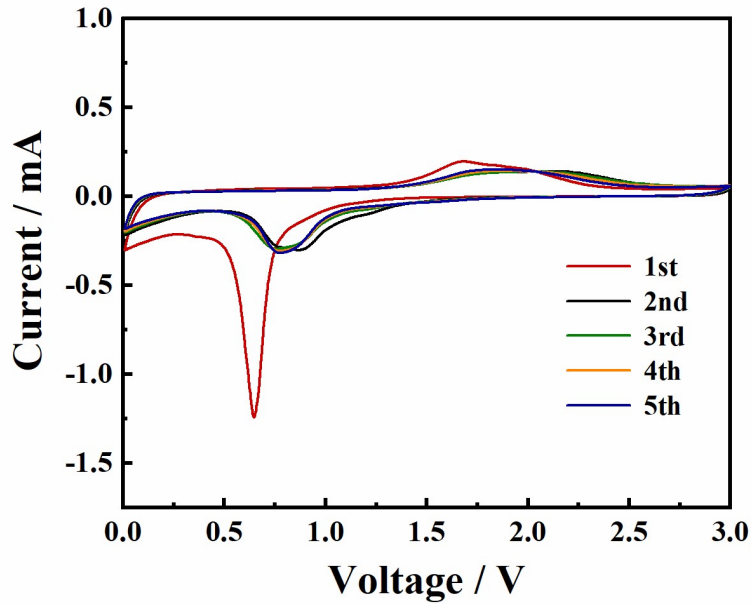


Fig. S3 CV curves of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>.

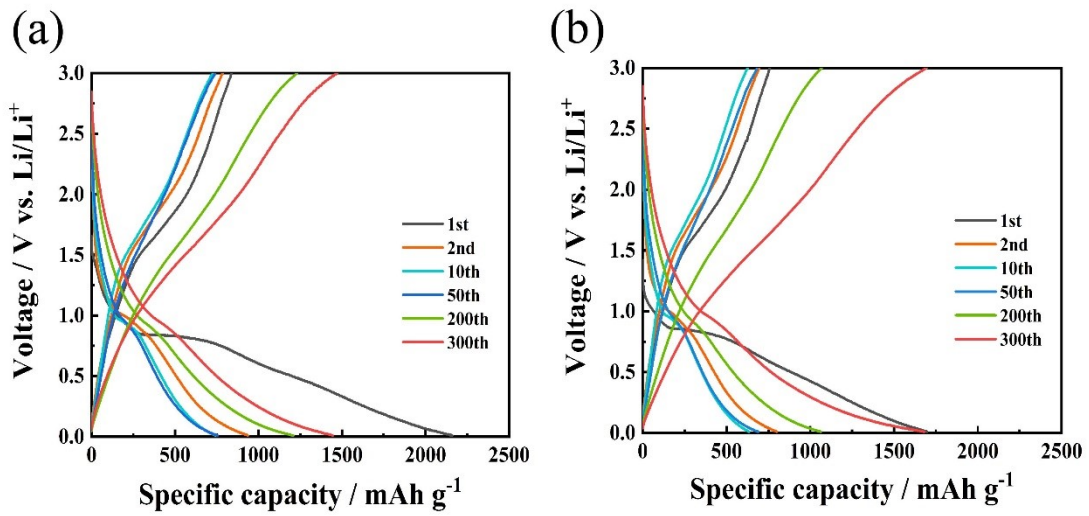


Fig. S4 The discharge/charge profiles for the 1st, 2nd, 10th, 50th, 200th, 300th of FO@LZU1<sub>20%</sub> (a) and FO@LZU1<sub>70%</sub> (b).

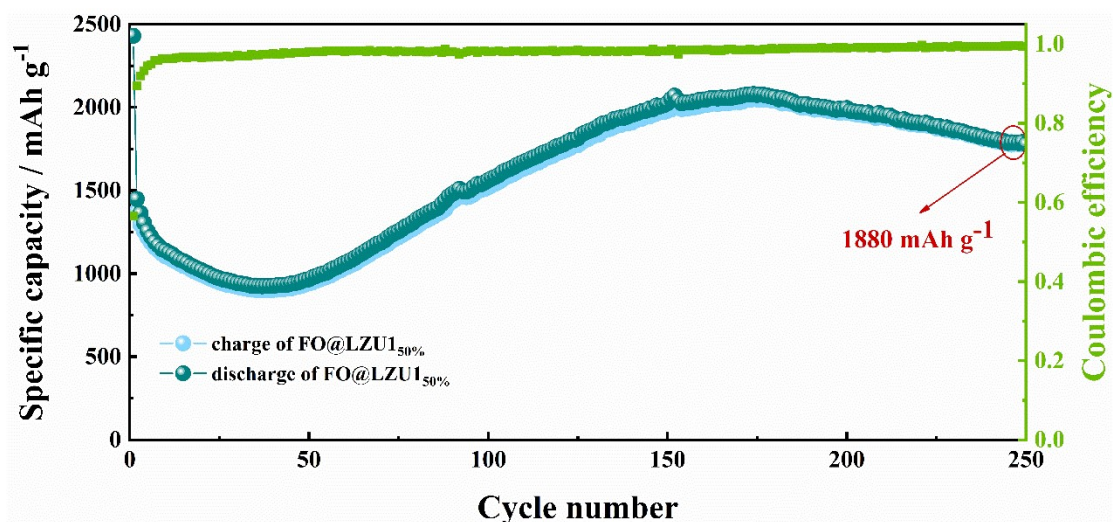


Fig. S5 The cycling performance of FO@LZU1<sub>50%</sub> at 0.5 A g<sup>-1</sup> after 250 cycles.

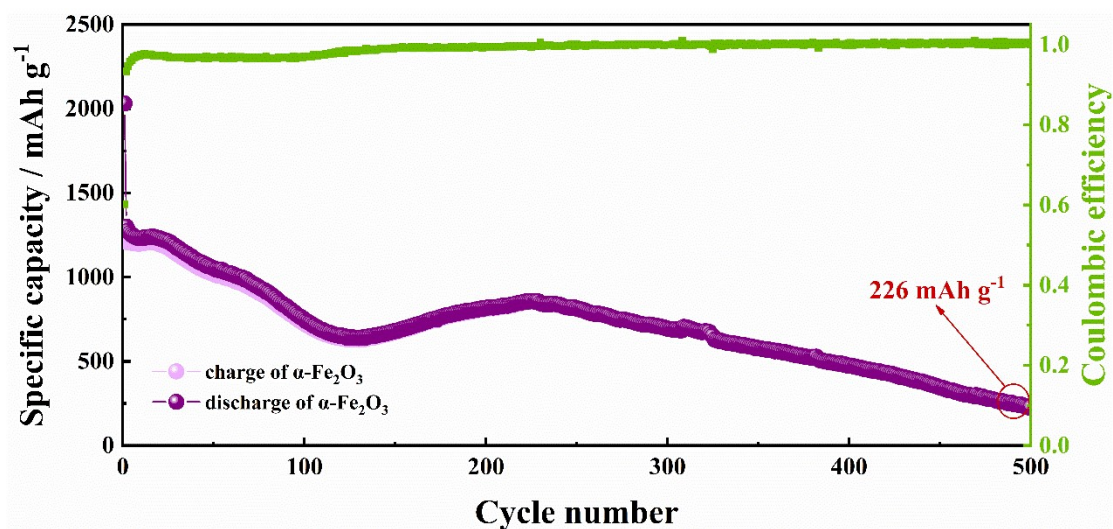


Fig. S6 The cycling performance of α-Fe<sub>2</sub>O<sub>3</sub> at 1 A g<sup>-1</sup> after 500 cycles.



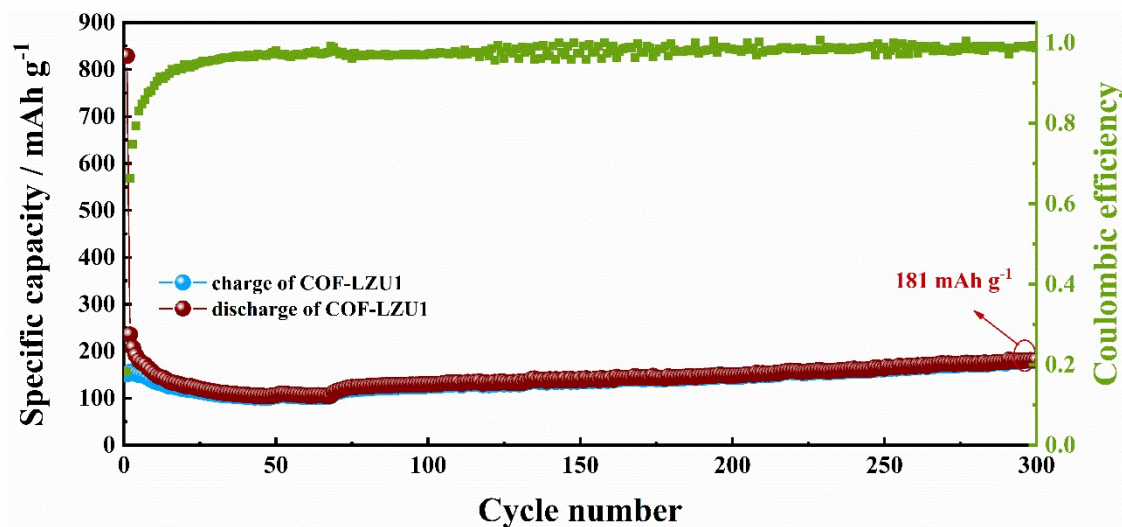


Fig. S7 The cycling performance of COF-LZU1 at 1 A g<sup>-1</sup> after 300 cycles.

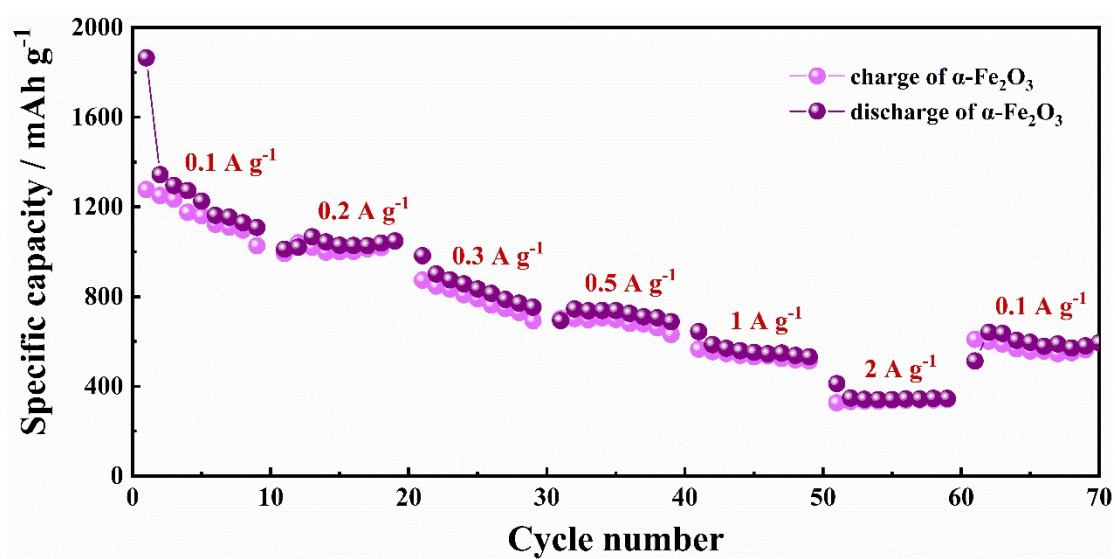


Fig. S8 Rate performance of α-Fe<sub>2</sub>O<sub>3</sub>.

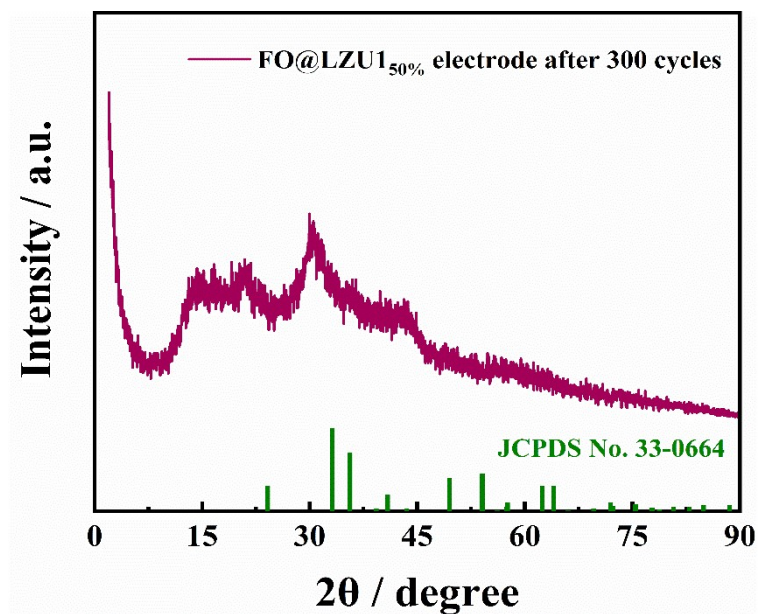


Fig. S9 XRD patterns of FO@LZU<sub>150%</sub> after 300 cycles.

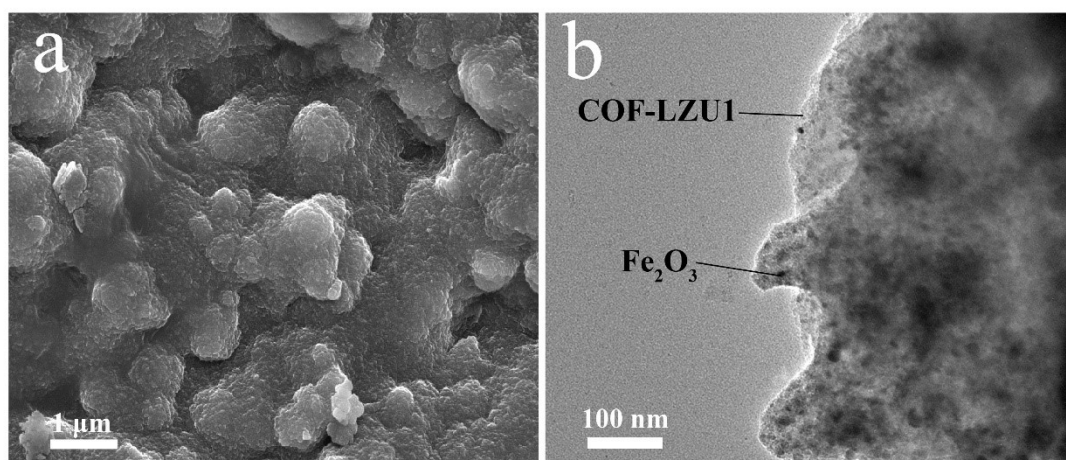


Fig. S10 SEM image (a) and TEM image (b) of FO@LZU<sub>150%</sub> after 300 cycles.