Electronic Supplementary Material (ESI) for Nanoscale.

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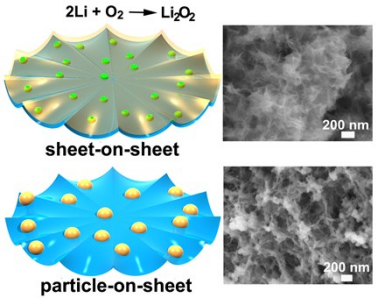
RuO_2/MnO_2 catalyzed Li–O_2 batteries show excellent high-rate performance due to nano-RuO_2 enabled fast wetting of Li_2O_2 on MnO_2 nanosheets.



Supporting Information

Nanostructured porous RuO_2/MnO_2 as highly efficient catalyst for high-rate Li–O_2 batteries

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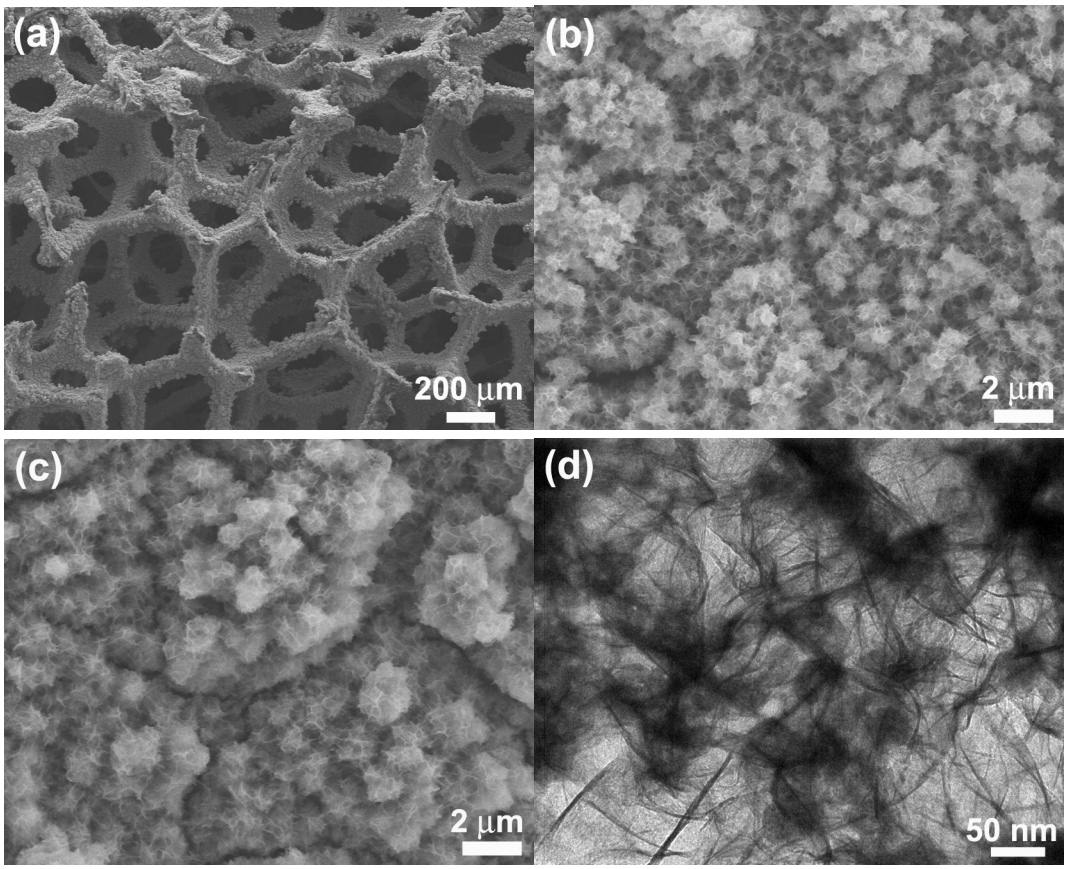


Fig. S1 (a,b) SEM images of MnO_2 on graphene-coated Ni foam, and (c) SEM and (d) TEM images of RuO_2/MnO_2 on graphene-coated Ni foam.

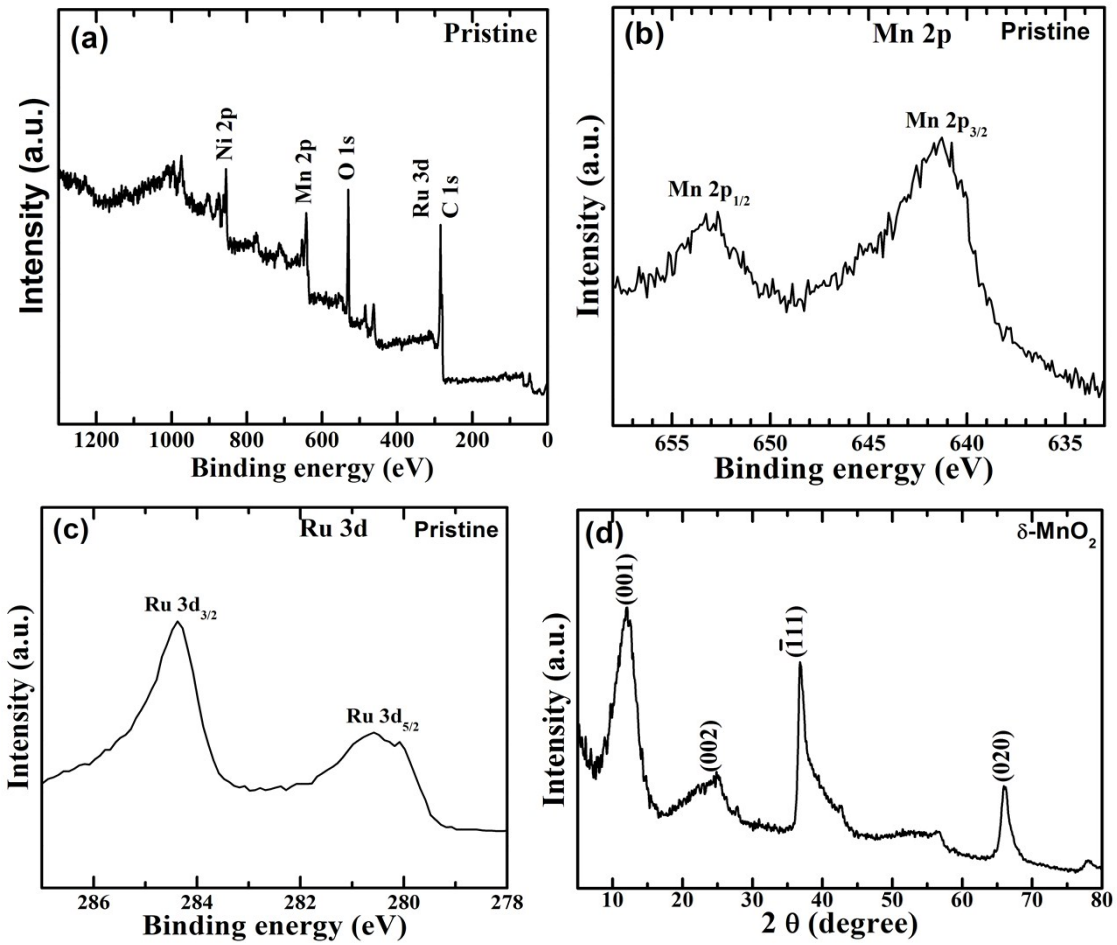
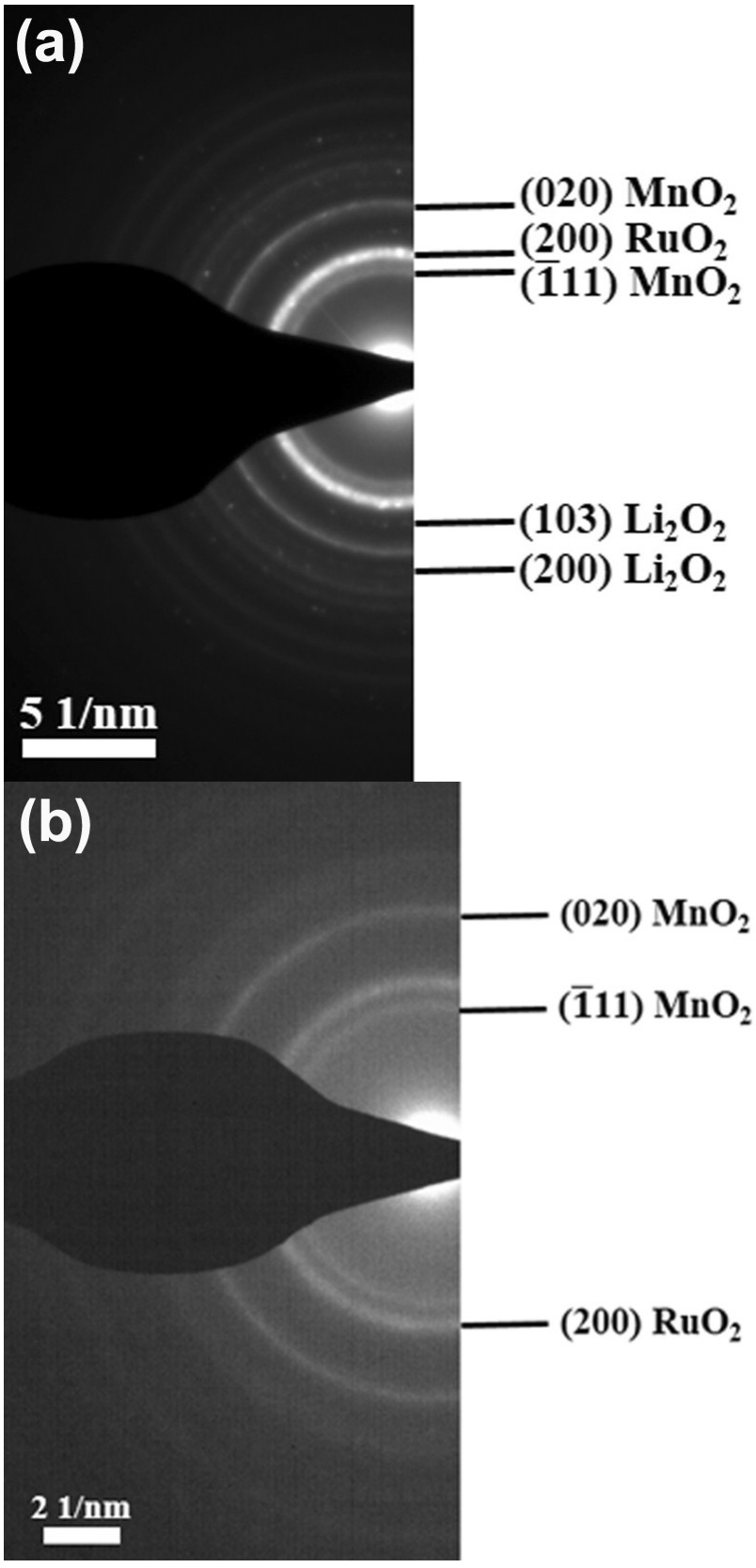


Fig. S2 (a) XPS survey of RuO_2/MnO_2 on graphene-coated Ni foam at the pristine state, (b) Mn 2p and (c) Ru 3d XPS at the pristine states, and (d) XRD patterns of δ-MnO_2.


(a)
(020) MnO2
(200) RuO2
(1̄11) MnO2
(103) Li2O2
(200) Li2O2
5 1/nm
(b)
(020) MnO2
(1̄11) MnO2
(200) RuO2
2 1/nm

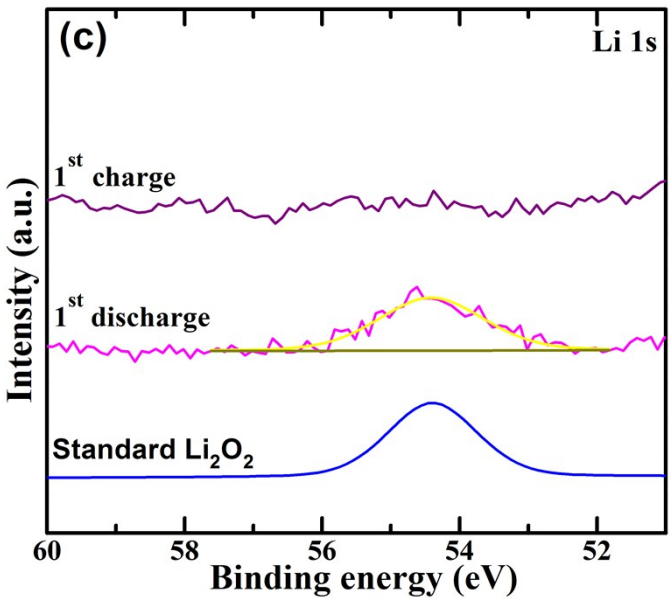


Fig. S3 (a) SAED patterns of the RuO_2/MnO_2 electrode (a) after discharge to 1000 mAh g^{-1} at 3200 mA g^{-1} and (b) in the pristine state, and (c) Li 1s XPS of the charged and discharged electrodes.

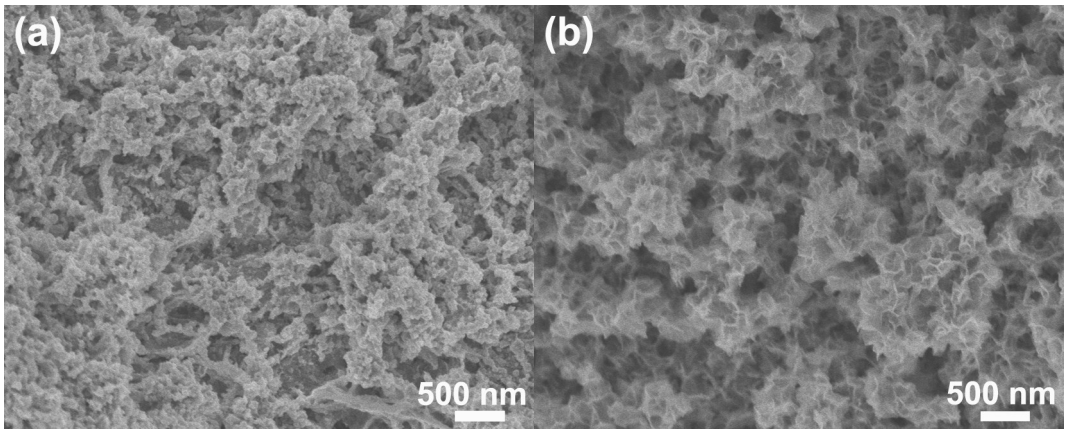


Fig. S4 SEM images of (a) MnO_2 and (b) RuO_2/MnO_2 electrodes discharged to 1000 mAh g^{-1} at 3200 mA g^{-1} with LiI.

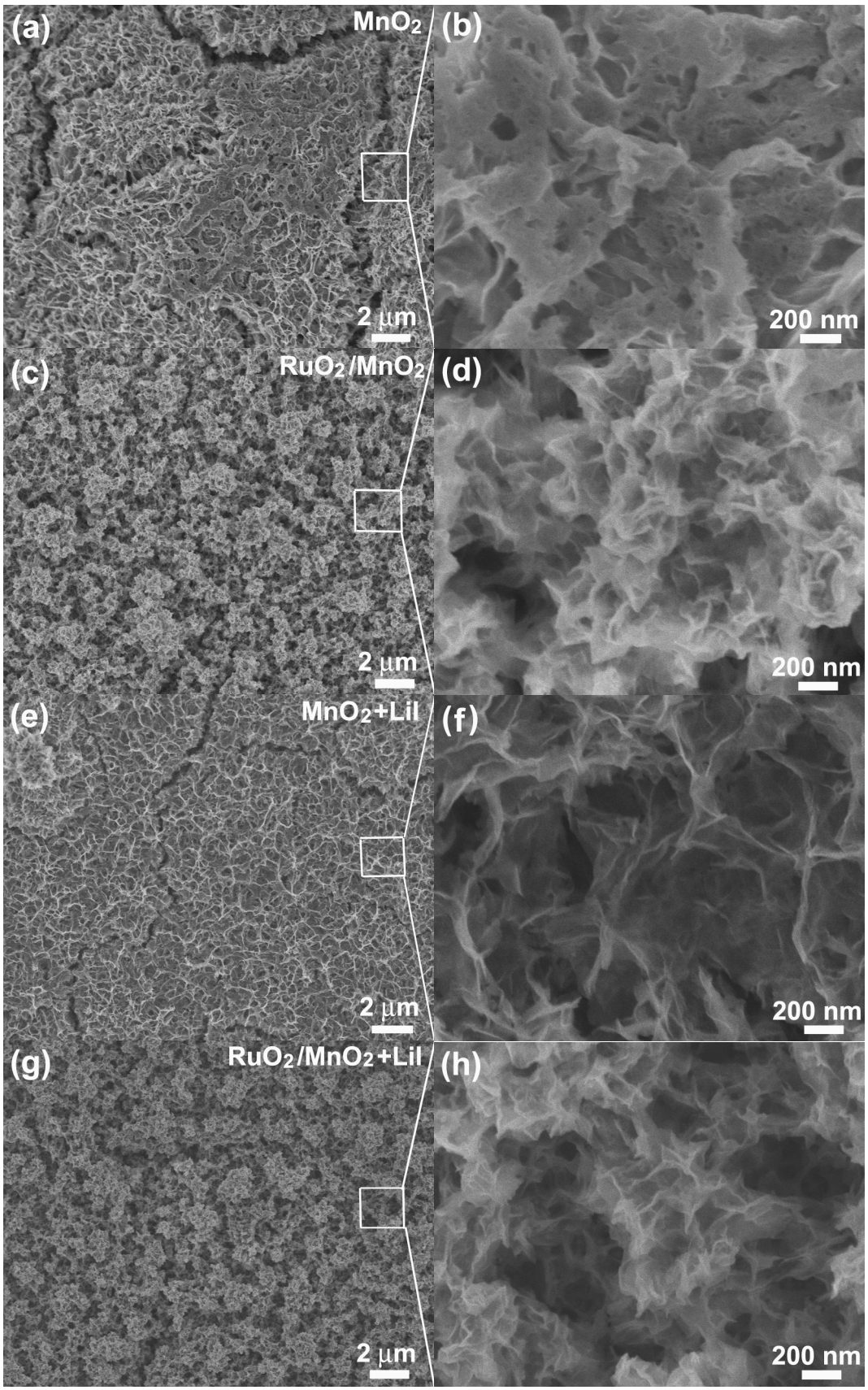


Fig. S5 SEM images of MnO_2 and RuO_2/MnO_2 electrodes after discharge and recharge to 1000 mAh g^{-1} at 3200 mA g^{-1} with and without LiI.

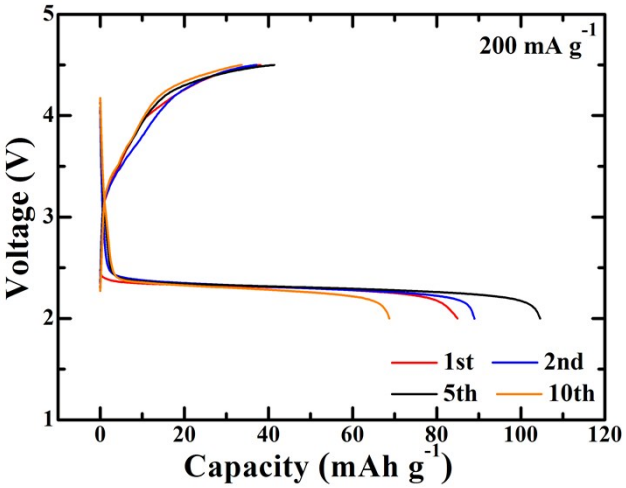
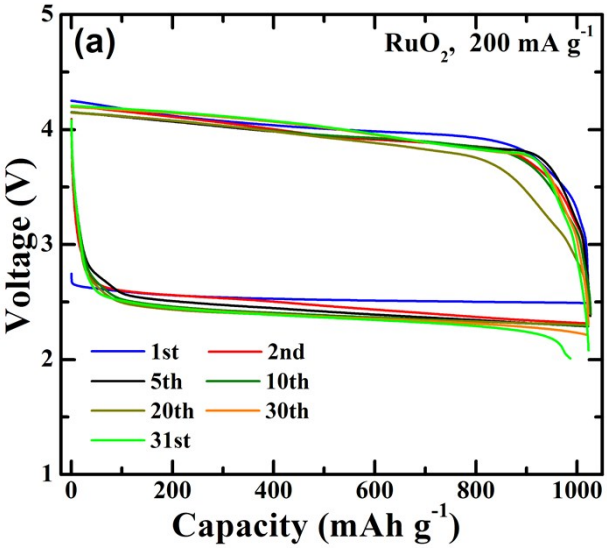


Fig. S6 Voltage profiles of the Li–O_2 batteries with bare graphene catalyst.



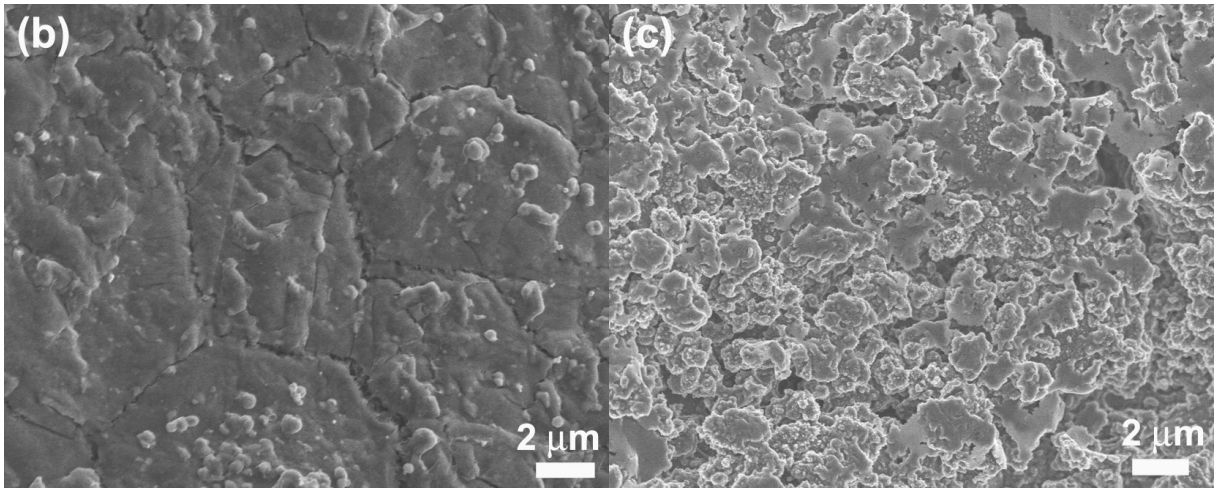


Fig. S7 (a) Voltage profiles of the Li–O_2 batteries with RuO_2/G electrode at 200 mA g^{-1}, and SEM image of the (b) pristine and (c) discharged RuO_2/G electrode.

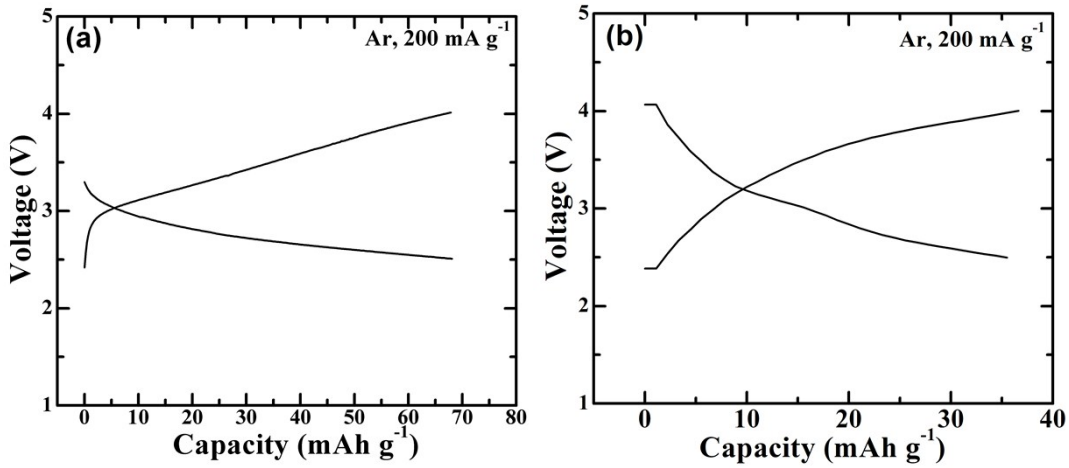


Fig. S8 Voltage profiles of (a) Li–MnO_2/G and (b) Li–RuO_2/G batteries tested in pure Ar.