Supplementary Materials

# Reversible Conversion between Lithium Superoxide and Lithium Peroxide: A Closed "Lithium–Oxygen" Battery

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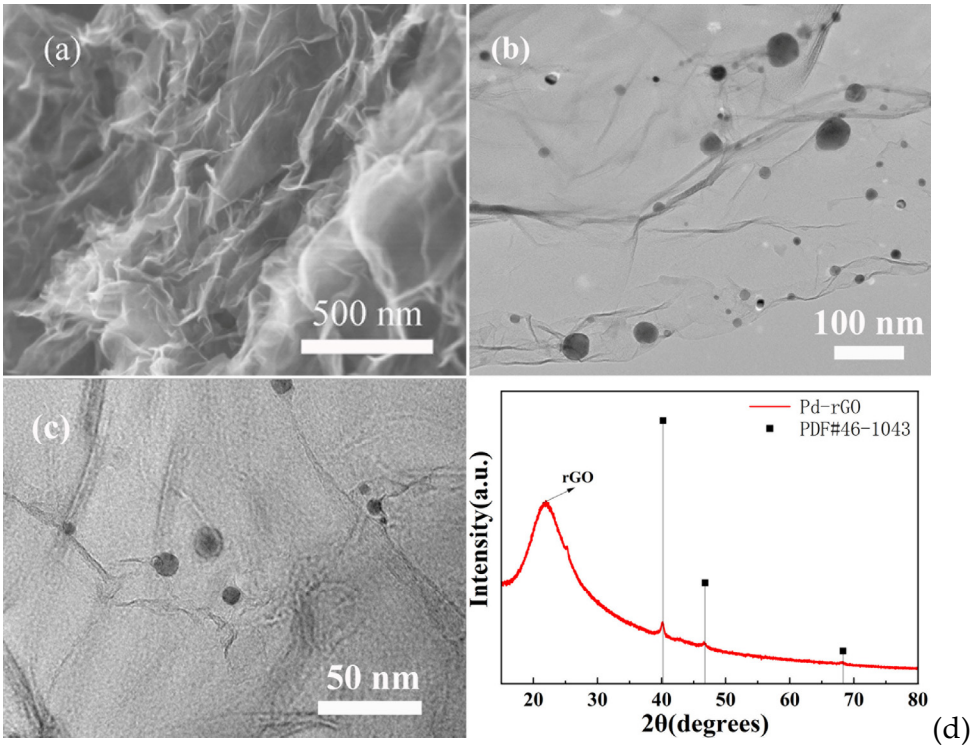


**Figure S1.** (**a**) SEM images of Pd-rGO; (**b**) and (**c**) TEM image and HRTEM of Pd-rGO, respectively; (**d**) the XRD patterns of Pd-rGO.

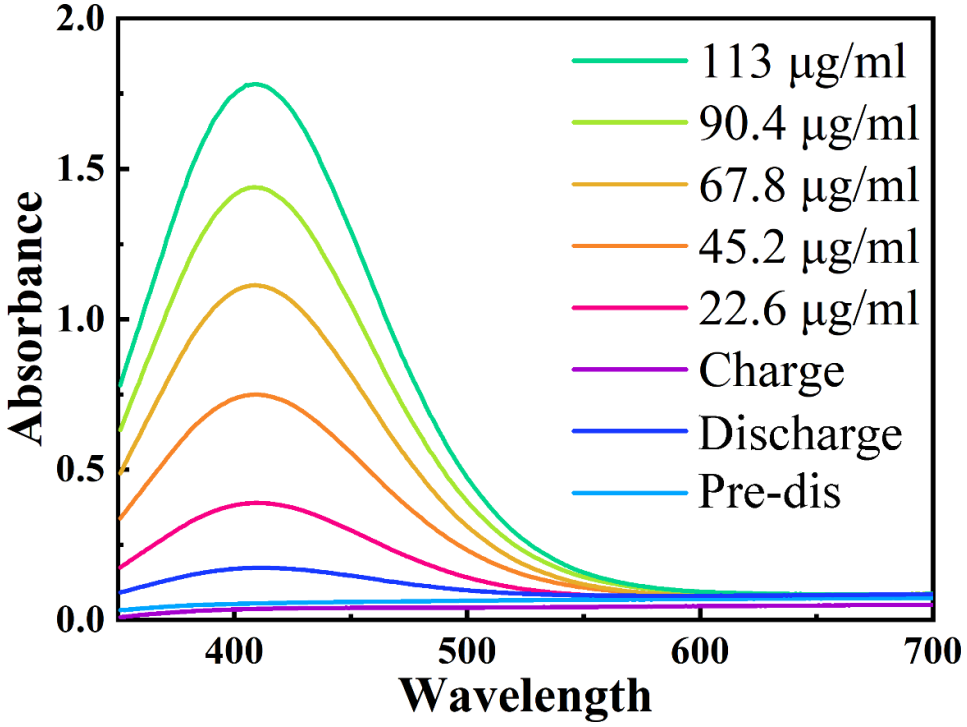


**Figure S2.** UV–Vis of Pd-rGO Li-$O_2$ battery. Cathodes with different discharge-specific capacities are immersed in a mixed solution of $TiOSO_4/H_2SO_4$ reagent and sulfuric acid.

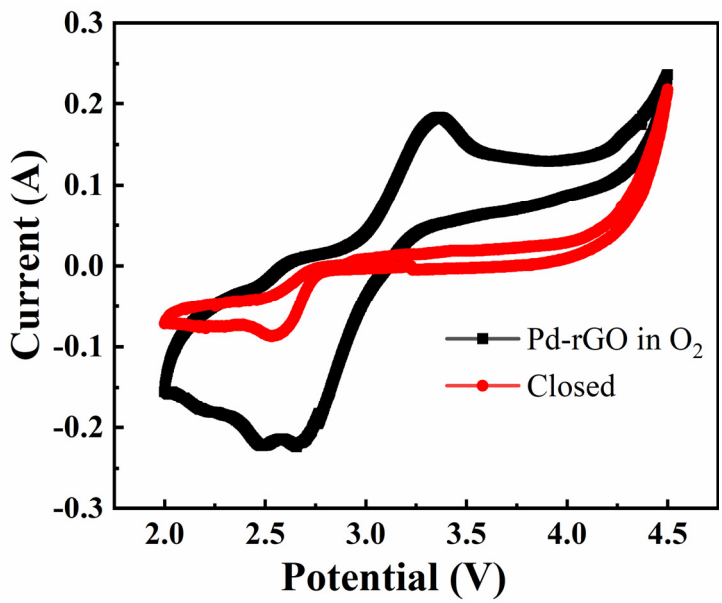


**Figure S3.** CV curves of Pd-rGO tested in an $O_2$ environment and a closed battery in the LiTFSI/TEGDME electrolyte at a scan rate of 0.1 mV $s^{-1}$.

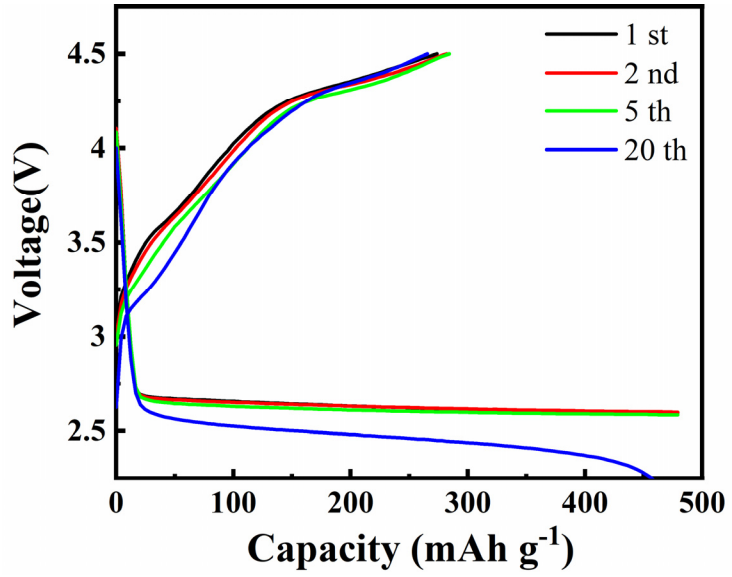


**Figure S4.** The cycle data of rGO closed batteries at 500 mA $g^{-1}$.