

## Improving Cyclability and Capacity of Lithium Oxygen Batteries via Low Rate Pre-Activation

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**Abstract :** Cycling life has become the threshold for the prospective application of Li-O<sub>2</sub> batteries, and the protection of Li anode has recently regarded as the key factor to the performance. Herein, a simple low rate pre-activation (20 cycles at 0.5 A g<sup>-1</sup> and a capacity of 200 mAh g<sup>-1</sup>) was employed to effectively improve the performance and cyclability of Li-O<sub>2</sub> batteries. The charge/discharge cycles at 1 A g<sup>-1</sup> with a capacity of 1000 mAh g<sup>-1</sup> were maintained for up to 290 times versus 55 times for the cell without pre-activation. The ultimate battery capacity and high rate discharge property were also largely enhanced. Morphology, XRD and XPS analyses reveal that the performance improvement is in close association with the formation of the smooth and compact surface layer formed on the Li anode after low rate pre-activation, which apparently alleviated the corrosion of Li anode and the passivation of cathode during battery cycling, and the corresponding mechanism was also discussed.

**Keywords :** lithium oxygen battery, pre-activation, cyclability, capacity

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