A Self-Recoverable $\text{LiTi}_2(\text{PO}_4)_3/\text{O}_2$ Hybrid Cathode for Lithium-Oxygen Batteries with High Power Performance

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Despite the potential of delivering desirably high energy, the wide application of lithium-oxygen batteries (LOBs) is severely restricted by its poor power performance. In this study, a $\text{LiTi}_2(\text{PO}_4)_3/\text{O}_2$ hybrid cathode was constructed, in which the carbon-coated $\text{LiTi}_2(\text{PO}_4)_3$ was prepared by a sol-gel method. Comparing to conventional LOB cathode, the $\text{LiTi}_2(\text{PO}_4)_3/\text{O}_2$ hybrid cathode (LOHC) exhibited considerable power density as high as $5.5 \text{ mW} \cdot \text{cm}^{-2}$ (more than 4 times of LOB cathode power density) at high currents up to $4 \text{ mA} \cdot \text{cm}^{-2}$ while retaining high-energy delivery at low currents. It also showed the ability of self-recovery to charged-state in the environment of oxygen (the capacity recovery percentage stayed around 80% in each resting process), which improved the high-power output durability. This work may provide a new approach to promote the development of lithium-oxygen batteries.

Keywords: Li-O₂ battery; $\text{LiTi}_2(\text{PO}_4)_3$; high power output; self-recovery

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