

## **Supporting Information**

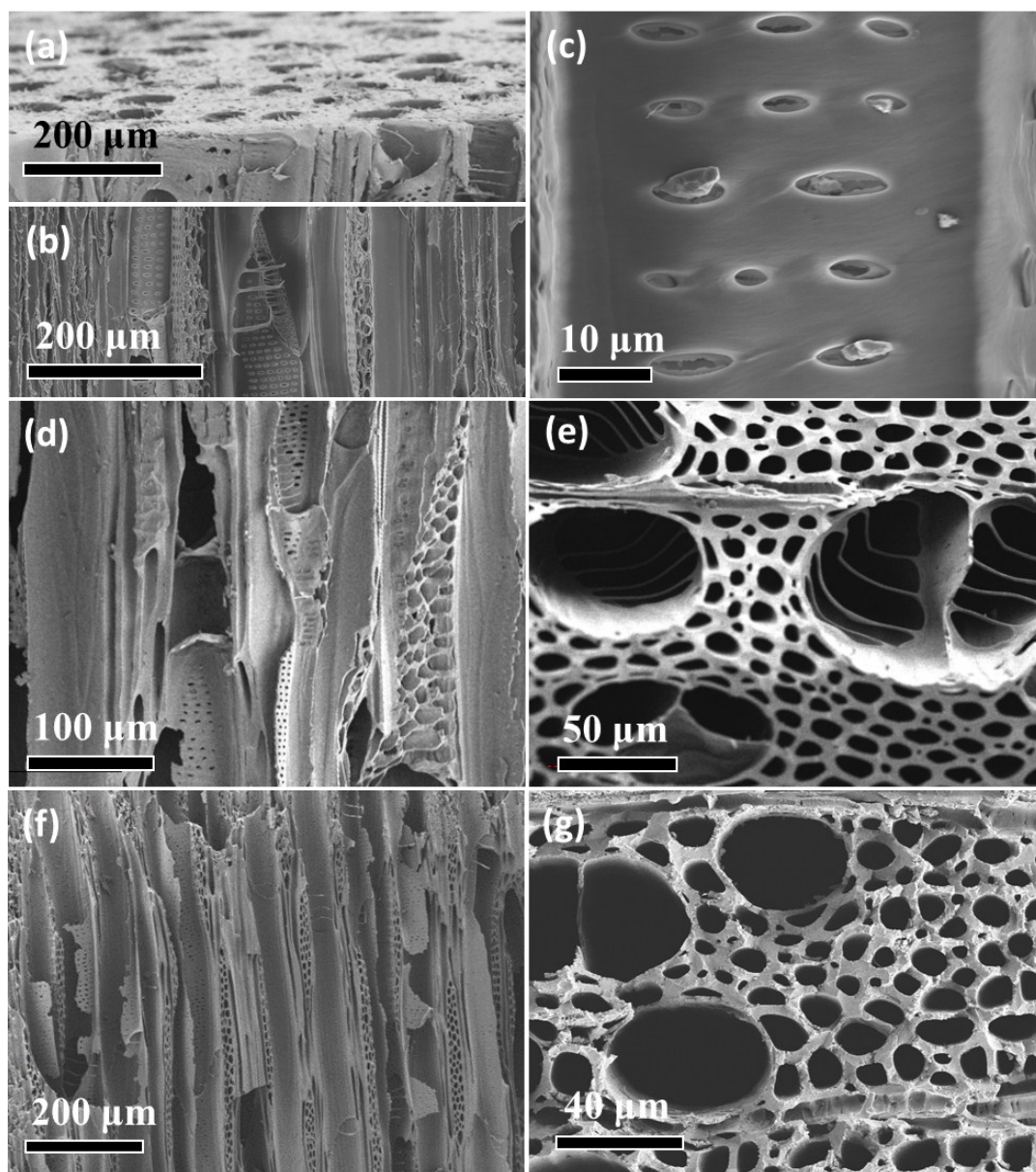
### **Renewable Wood-Derived Cathode for Li-O<sub>2</sub> Batteries**

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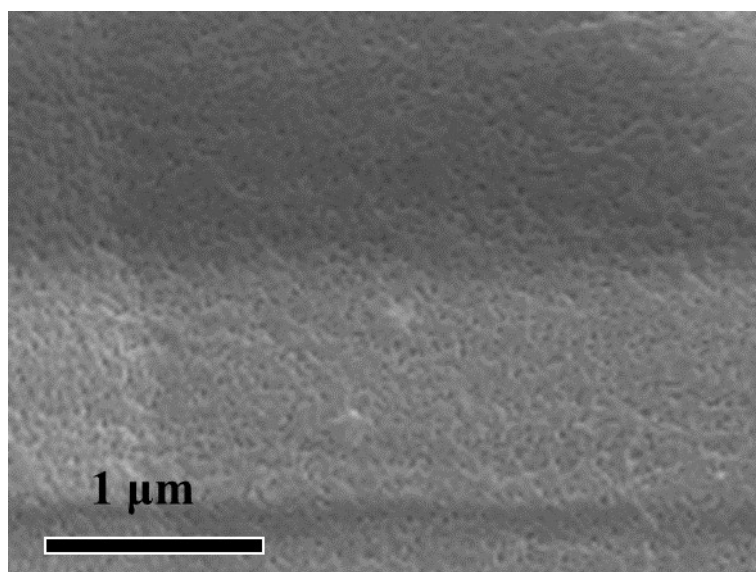
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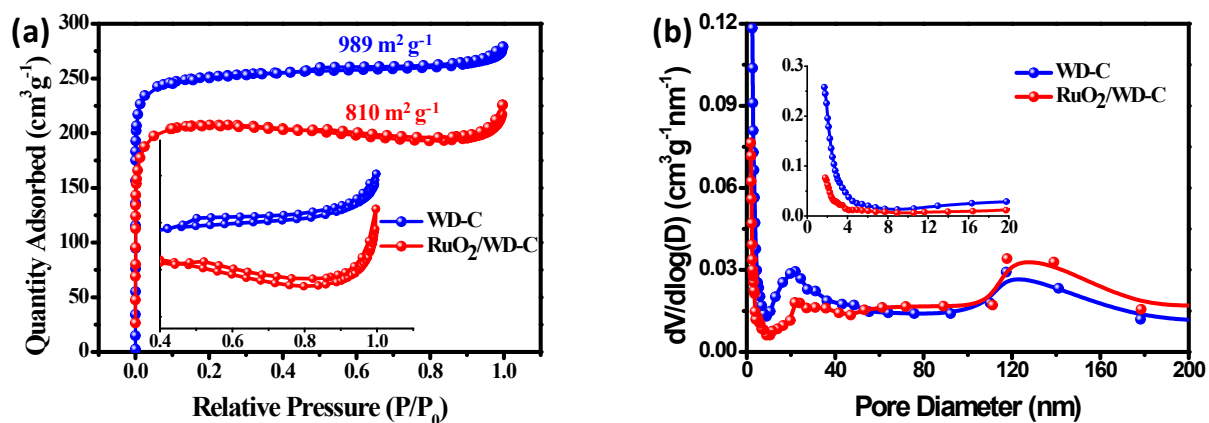
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**Fig. S1** SEM images: (a-b) side view of natural poplar, (c) poplar channel surface; (d-e) side view and top view of carbonized wood; (f-g) side view and top view of activated wood.

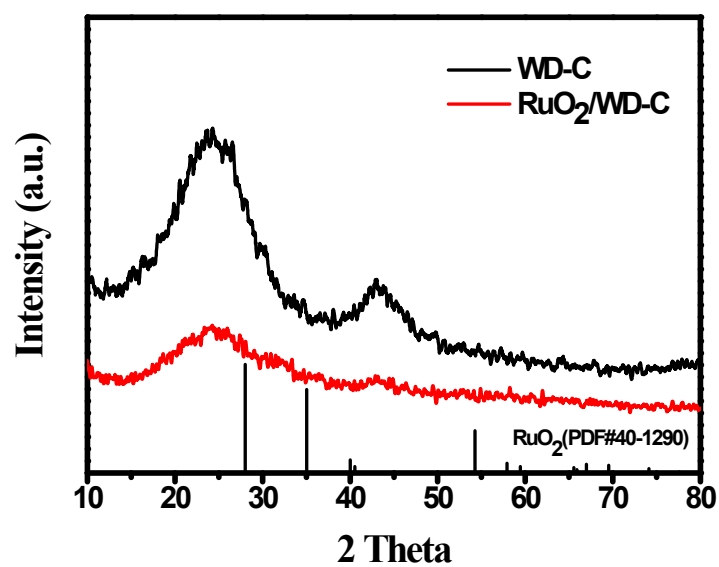


**Fig. S2** SEM images of the activated wood carbon.  
Numerous mesopores were formed on the channel walls by CO<sub>2</sub> activation.



**Fig. S3** N<sub>2</sub> adsorption-desorption isotherms (a) and pore size distributions (b) of WD-C and RuO<sub>2</sub>/WD-C.

The N<sub>2</sub> adsorption-desorption isotherm curves are type I, and the hysteresis loops reflect the features of mesoporous structure. The pore size distributions show at <2 nm, ~22 nm and ~120 nm, indicating that WD-C and RuO<sub>2</sub>/WD-C both have hierarchically porous structure.



**Fig. S4** XRD patterns of the activated wood before and after loading RuO<sub>2</sub>.

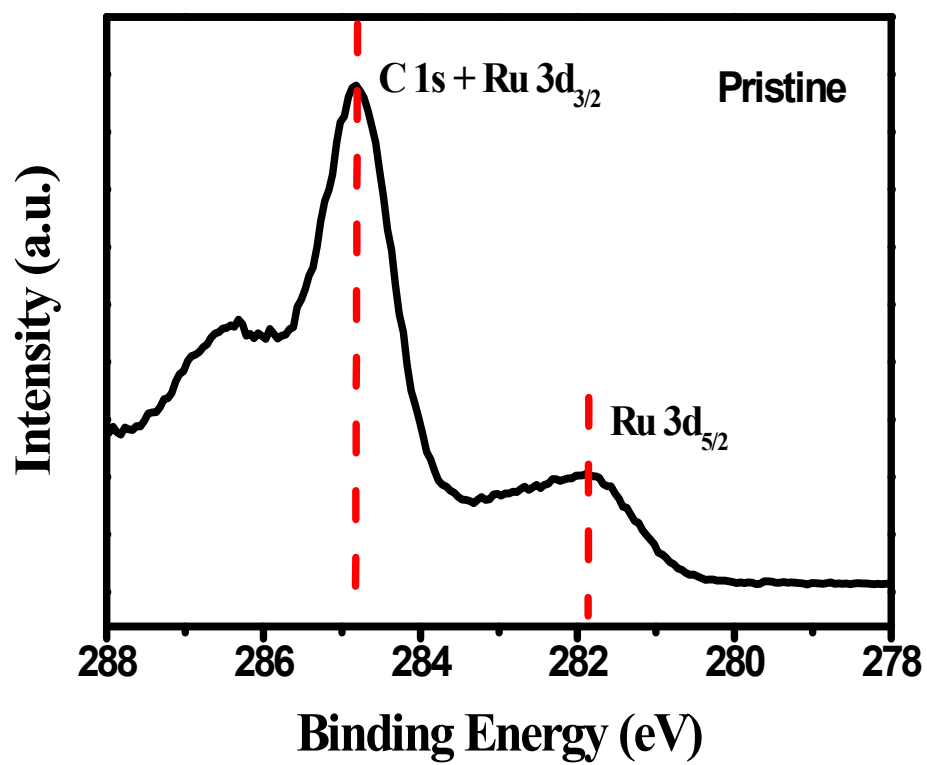
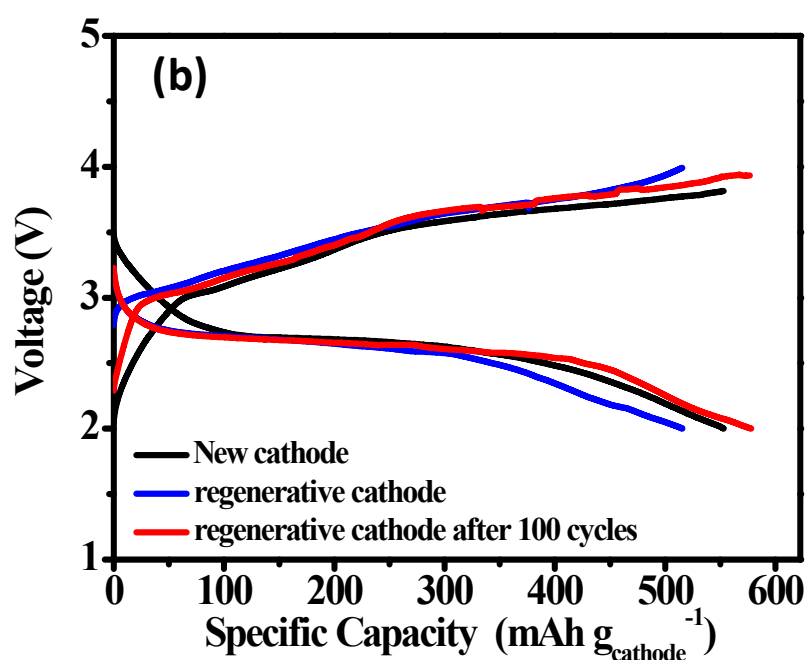
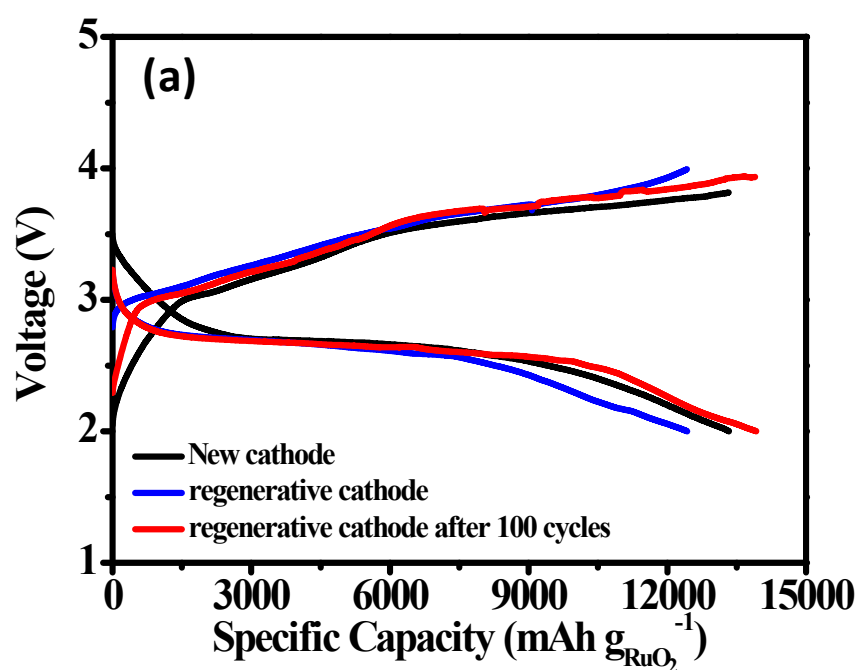


Fig. S5 C 1s and Ru 3d XPS spectrum of RuO<sub>2</sub>/WD-C.



**Fig. S6** The discharge-charge curves of RuO<sub>2</sub>/WD-C cathodes at a current density of 0.1 mA cm<sup>-2</sup>, which is based on the mass of RuO<sub>2</sub> nanoparticles (a) and the whole cathode (b). The curves are corresponding to the cathodes of pristine (black), regenerated after one deep cycle (blue), and regenerated after 100 cycles (red), respectively.

Table S1 The conversion between the specific areal capacities and the specific gravimetric capacities of RuO<sub>2</sub>/WD-C cathodes <sup>a, b</sup>

	Pristine cathode	Regenerated cathode after 1 deep cycle	Regenerated cathode after 100 cycles
Specific areal capacity (mAh cm <sup>-2</sup> )	8.02	7.47	8.38
Specific gravimetric capacities (mAh g <sub>RuO<sub>2</sub></sub> <sup>-1</sup> , only accounting RuO <sub>2</sub> mass)	13328	12414	13926
Specific gravimetric capacities (mAh g <sup>-1</sup> , accounting the whole cathode mass)	553	515	578

a The average areal mass density of the RuO<sub>2</sub>/WD-C cathode is 14.5 mg cm<sup>-2</sup>.

b The mass loading of RuO<sub>2</sub> in cathode is 4.15 wt%.