

## Low Crystalline Oxygen-vacancy-rich Co<sub>3</sub>O<sub>4</sub> Cathode for High-Performance Flexible Asymmetric Supercapacitors

Jiixin Hao,<sup>a</sup> Shanglong Peng,<sup>\* a</sup> Haoqian Li,<sup>a</sup> Shan Dang,<sup>a</sup> Tianfeng Qin,<sup>a</sup> Yuxiang Wen,<sup>a</sup> Juanjuan Huang,<sup>a</sup> Fei Ma,<sup>a</sup> Daqiang Gao,<sup>a</sup> Feng Li,<sup>c</sup> Guozong Cao,<sup>\*a,b</sup>

<sup>a</sup>Key Laboratory for Magnetism and Magnetic Materials of the Ministry of Education, School of Physical Science and Technology, Lanzhou University, Lanzhou 730000, P.R. China.

<sup>b</sup> Department of Materials Science and Engineering, University of Washington, Seattle, Washington 98195-2120, United States

<sup>c</sup> Institute of Metal Research, Chinese Academy of Science, Shenyang 110016, China

\* Corresponding authors (emails: pengshl@lzu.edu.cn (Peng S); gzcao@u.washington.edu (Cao G))

### Calculation section

The specific capacitances  $C_m$  (F g<sup>-1</sup>) were calculated from GCD curves according to the equation:[1]

$$C_m = I \times \Delta t / (m \times \Delta V) \quad (1) \quad \text{Where}$$

$I$  (A) is the constant discharge current density,  $\Delta t$  (s) the discharge time,  $m$  (g) the mass loading of the active materials and  $\Delta V$  (V) the voltage drop upon discharging.

The areal capacitances  $C_a$  (F cm<sup>-2</sup>) were calculated from the specific capacitance according to the equation:

$$C_a = C_m \times m \quad (2)$$

The energy density ( $E$ ) and power density ( $P$ ) of the device are calculated according to the equations below: [2]

$$E = C \times \Delta V^2 / (2 \times 3.6) \quad (3)$$

$$P = E \times 3600 / \Delta t \quad (4)$$

Where  $C$  is the areal capacitance of the ASC,  $V$  the effective volume of the ASC,  $\Delta V$  the operating voltage window and  $\Delta t$  the discharge time.

## Supporting figures

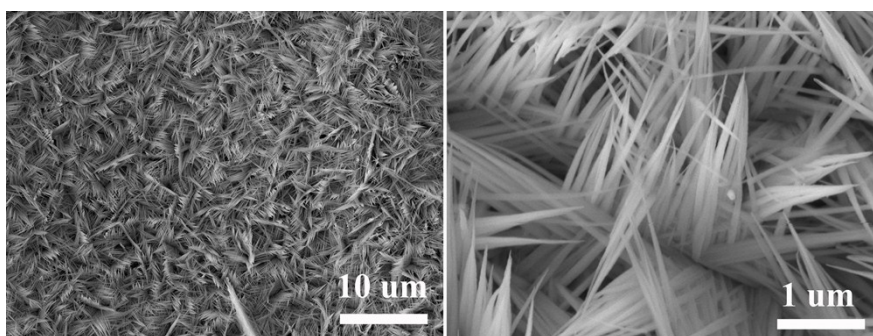


Fig. S1 SEM images of pristine  $\text{Co}_3\text{O}_4$  with different magnification.

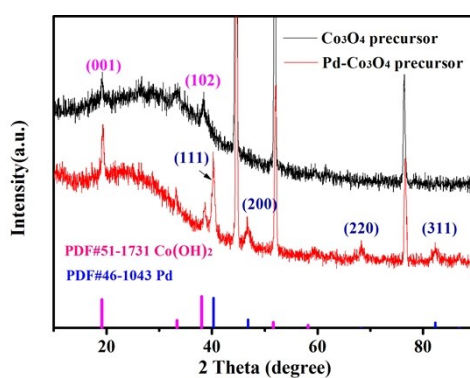


Fig.S2 XRD patterns of precursor for Pd- $\text{Co}_3\text{O}_4$  and pristine  $\text{Co}_3\text{O}_4$ .

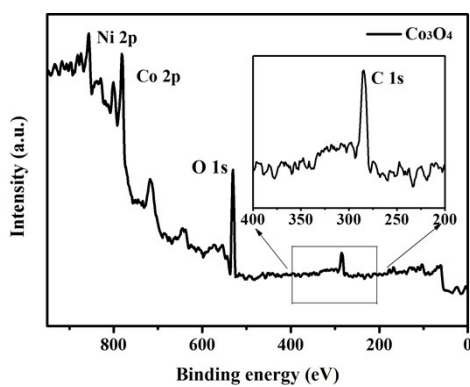


Fig. S3 The wide XPS spectrum of pristine  $\text{Co}_3\text{O}_4$ .

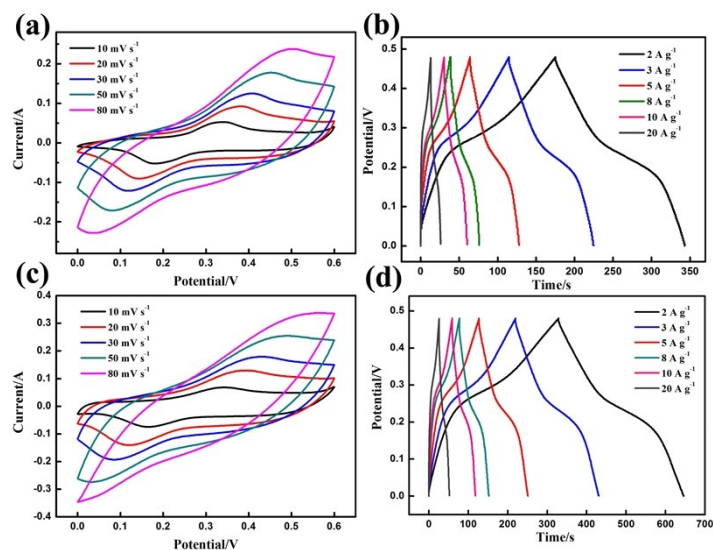


Fig. S4 (a) CV curves and (b) GCD curves of pristine  $\text{Co}_3\text{O}_4$ . (c) CV curves and (d) GCD curves of  $\text{Pd-Co}_3\text{O}_4$ .

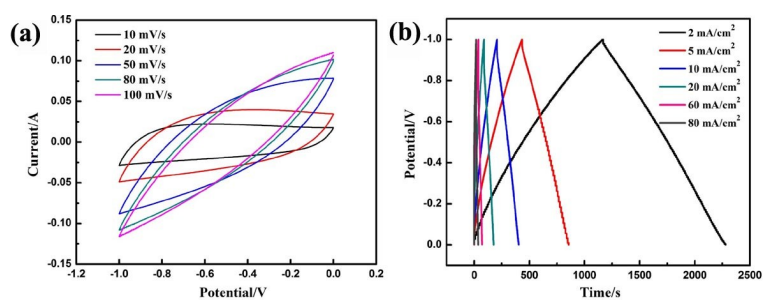


Fig. S5 (a) CV curves of carbon cloth electrode at different scan rate. (b) GCD curves of carbon cloth electrode at various current density.

## Reference

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- [2] D. Kong, C. Cheng, Y. Wang, J.I. Wong, Y. Yang, H.Y. Yang, *Journal of Materials Chemistry A*, 3 (2015) 16150-16161.