

**Supporting Information for**  
**A Li-O<sub>2</sub>/CO<sub>2</sub> Battery Based on Bio-inspired engineering of**  
**Bi<sub>2</sub>S<sub>3</sub>/PVP cathode**

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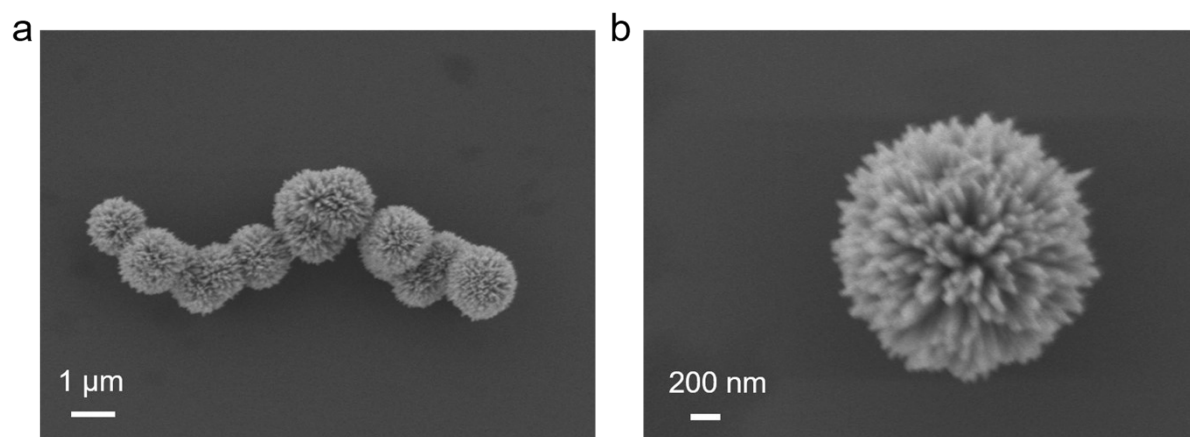
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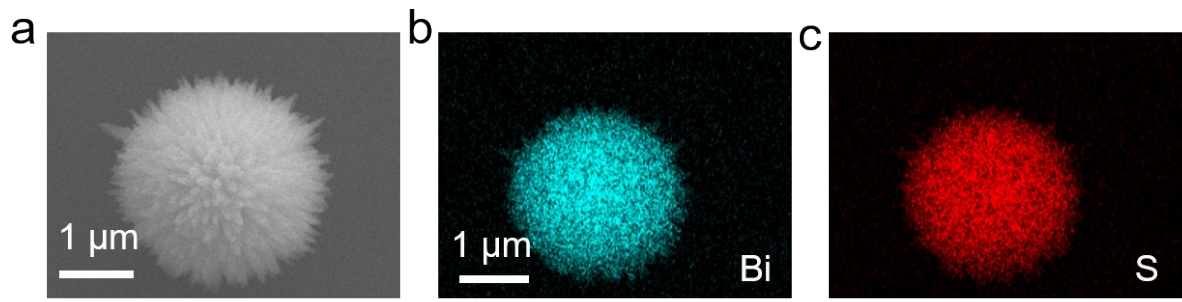
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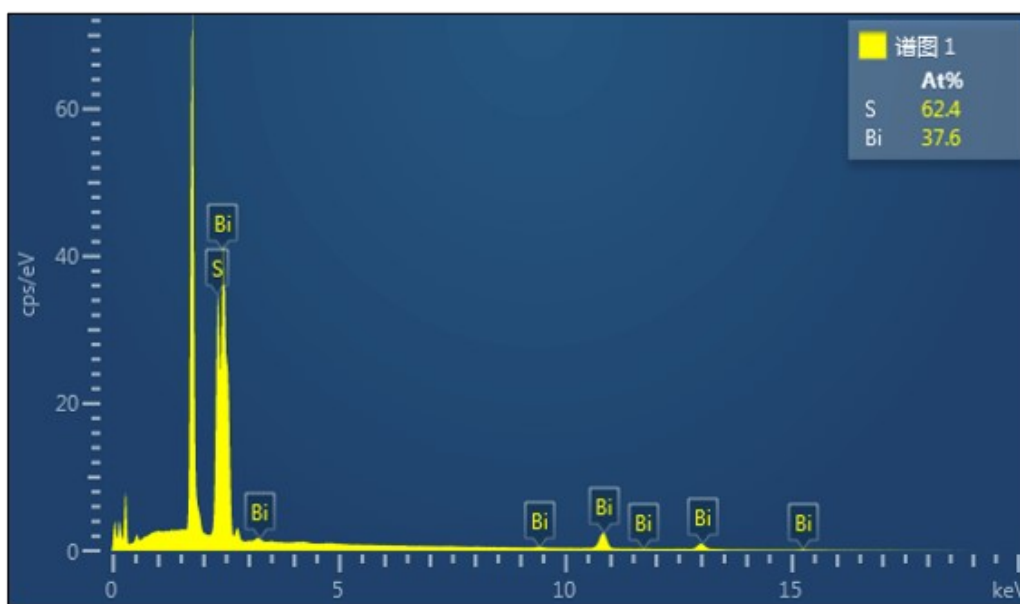
## Supplementary Figures



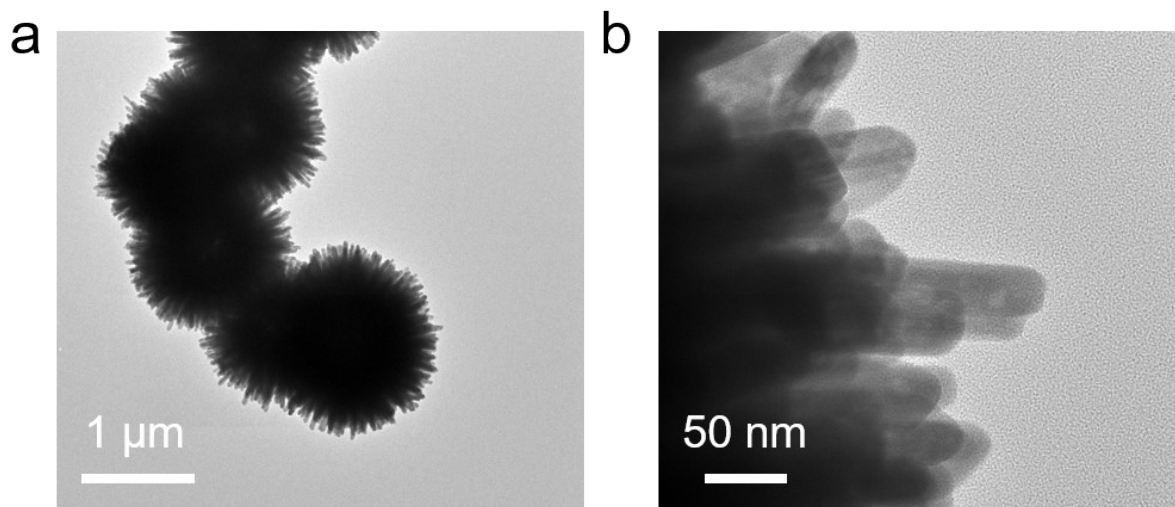
**Figure S1.** (a) and (b) SEM images of  $\text{Bi}_2\text{S}_3$ .



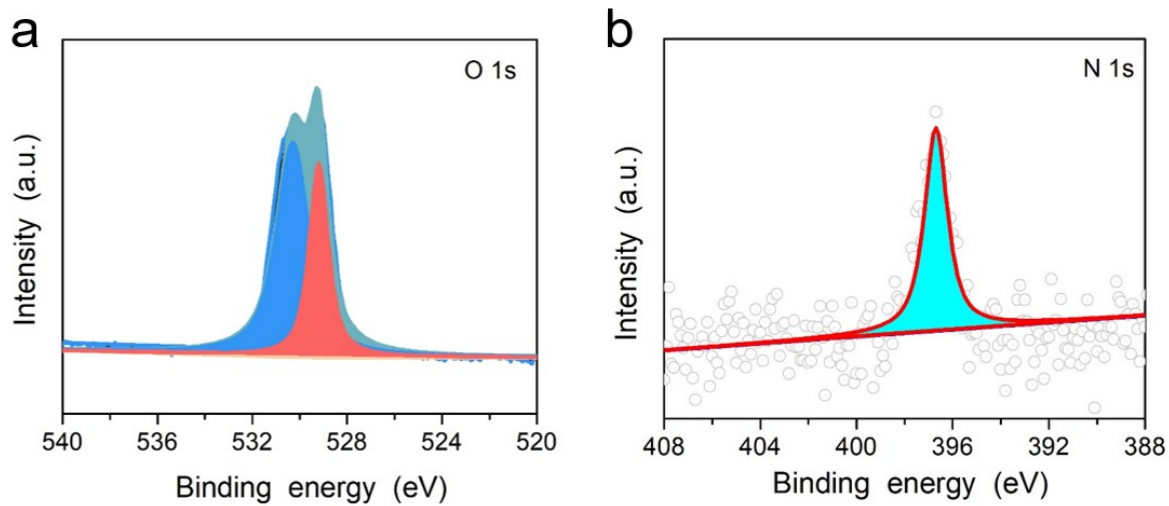
**Figure S2.** (c) and (d)EDS element mapping images of  $\text{Bi}_2\text{S}_3$ .



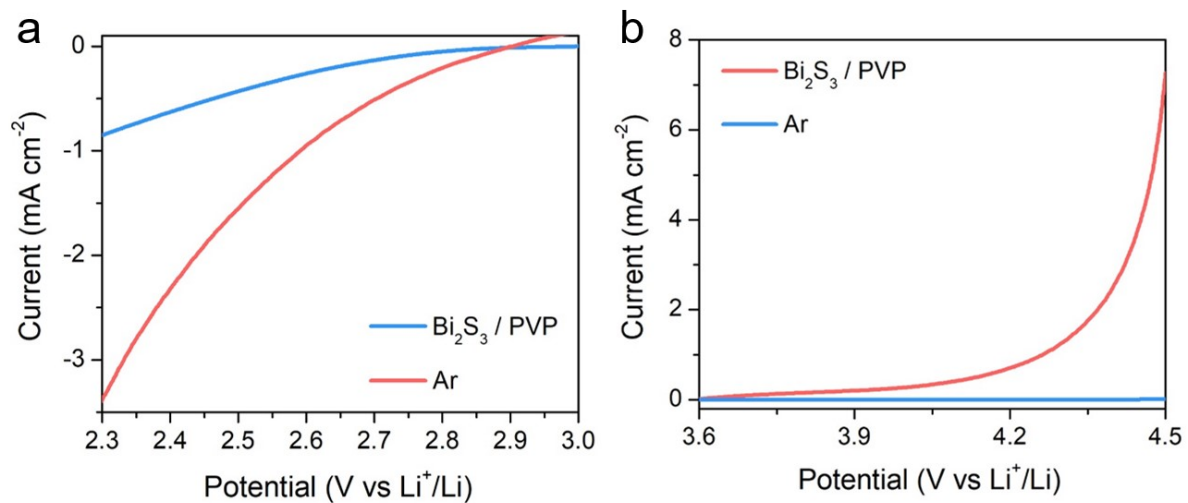
**Figure S3.** The Energy spectrum images of  $\text{Bi}_2\text{S}_3$ .



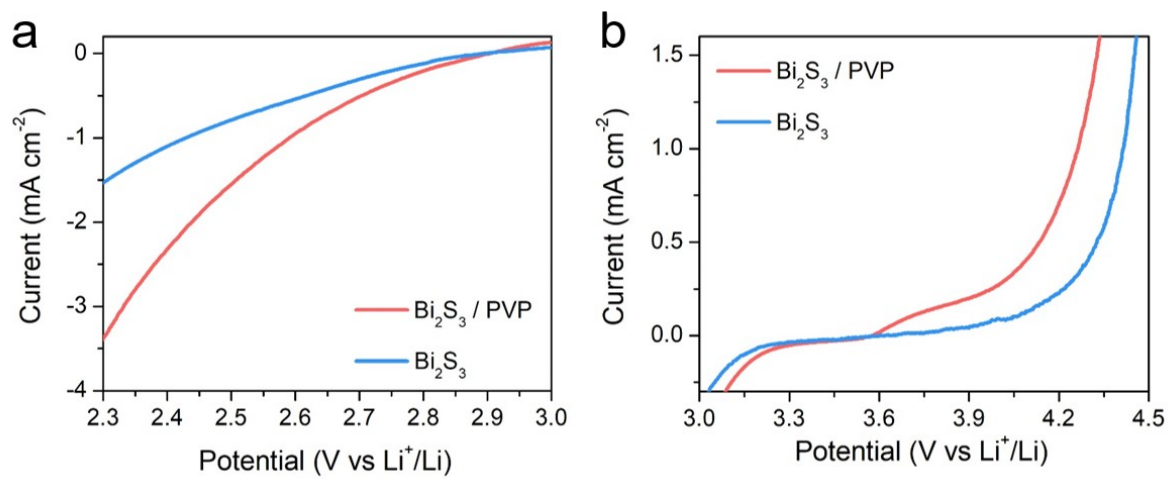
**Figure S4.** (a) and (b) TEM images of  $\text{Bi}_2\text{S}_3$ .



**Figure S5.** (a) and (b) XPS spectras of O 1s, N 1s.

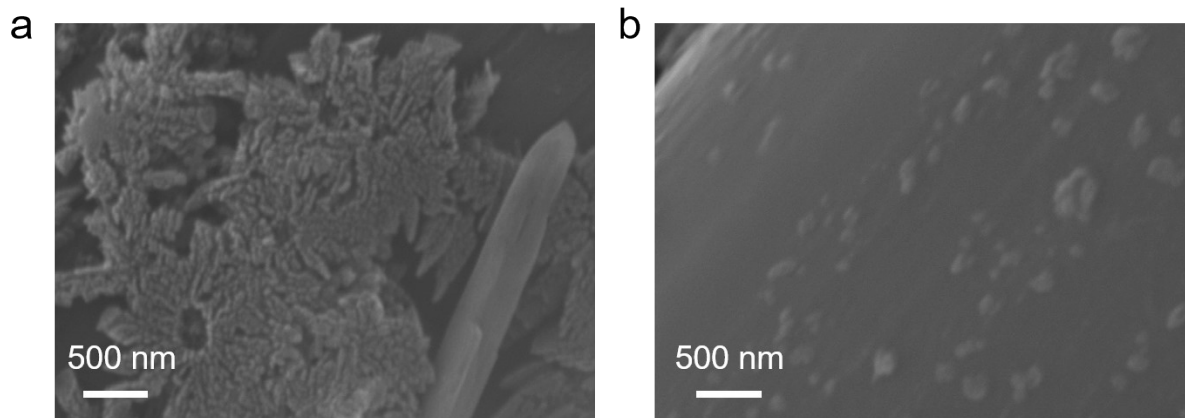


**Figure S6.** LSV curves of (a) ORR and (b) OER process for Bi<sub>2</sub>S<sub>3</sub>/PVP cathode in O<sub>2</sub>/Ar atmosphere at a scan rate of 5 mV s<sup>-1</sup>.

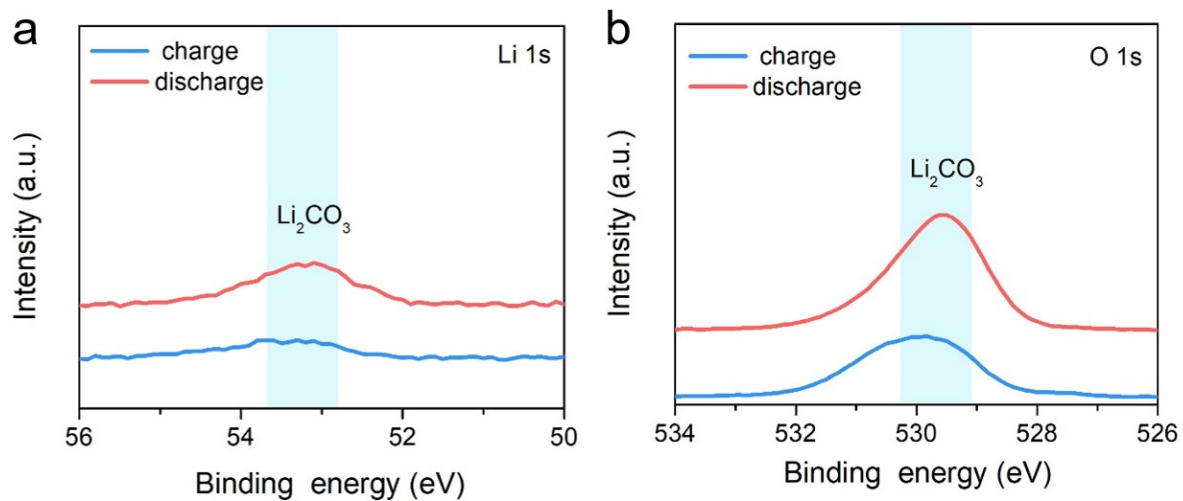


**Figure S7.** LSV curves of (a) ORR and (d) OER process for Bi<sub>2</sub>S<sub>3</sub>/PVP and Bi<sub>2</sub>S<sub>3</sub> cathodes in O<sub>2</sub> atmosphere at a scan rate of 5 mV s<sup>-1</sup>.





**Figure S8.** (a) and (b) SEM images of the discharged and charged  $\text{Bi}_2\text{S}_3$  cathode.



**Figure S9.** XPS spectra of the discharge product of  $\text{Li}_2\text{CO}_3$ .