

## Supporting information

### **SI: Collections of all the biological organisms**

The *O. Sinesis* and *C. Barometz* spores were obtained from Mountain Huading (Zhejiang, China) and they were cultivated in Fern Artificial Cultivation Laboratory of Harbin Normal University (HANU, 126°42'E, 45°24'N). When harvest began, the mature microsporangia were plucked and washed in distilled water for three times. Then the cleaned microsporangia were transferred to a super-cleaned table and the walls of microsporangia were carefully dilacerated. The fallen spores were collected, purified and stored at 5~10 °C.

**S-2: Calculation of the specific capacity for iodine/C composite.**

The specific capacity of iodine/C composite is calculated based on the following equation,

$$C_{\text{iodine}} = \frac{Q_{\text{iodine/C}} - Q_C}{m_{\text{iodine}}} \quad (2)$$

Where  $C_{\text{iodine}}$  is specific capacity of pure iodine in the iodine/C electrode;  $Q_{\text{iodine/C}}$  is the capacity of the iodine/C electrode;  $Q_C$  is the capacitance capacity of carbon host;  $m_{\text{iodine}}$  is the mass of iodine.”