

泡沫铜基底原位生长的铜基导电金属有机框架作为双功能电催化剂

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Copper-based Conductive Metal Organic Framework *in situ* Grown on Copper Foam as a Bifunctional Electrocatalyst

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图 S1 空白泡沫铜(CF = Copper Foam)、 $\text{Cu}(\text{OH})_2/\text{CF}$ 和 $\text{Cu}_3\text{HITP}_2/\text{CF}$ 的光学照片(从左至右)
Fig. S1 Optical photographs of Copper Foam, $\text{Cu}(\text{OH})_2/\text{CF}$ and $\text{Cu}_3\text{HITP}_2/\text{CF}$ (from left to right).

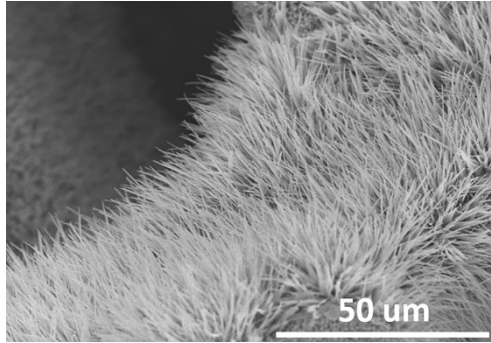


图 S2 在泡沫铜上生长的 $\text{Cu}(\text{OH})_2$ 纳米线的 SEM 图谱
Fig. S2 SEM image of $\text{Cu}(\text{OH})_2$ Nanowires on Copper Foam.

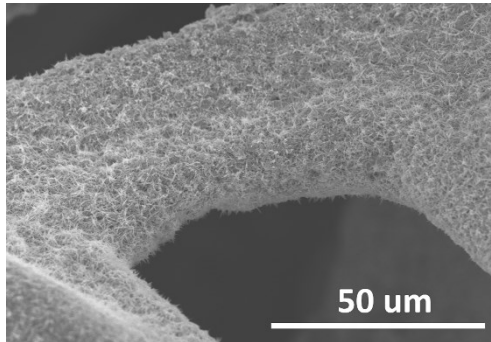


图 S3 通过 $\text{Cu}(\text{OH})_2$ 纳米线原位转化得到的 Cu_3HITP_2 的 SEM 图谱
Fig. S3 SEM image of Cu_3HITP_2 from $\text{Cu}(\text{OH})_2/\text{CF}$.

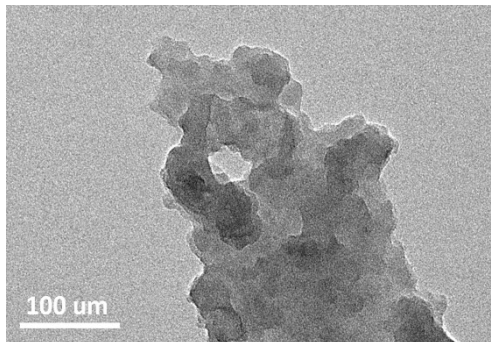


图 S4 Cu_3HITP_2 的 TEM 图谱
Fig. S4 TEM image of Cu_3HITP_2 .

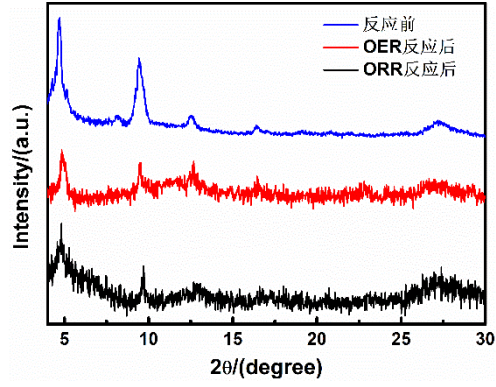


图 S5 OER/ORR 反应前后 Cu_3HITP_2 的 XRD 图谱

Fig. S5 XRD patterns of Cu_3HITP_2 before and after OER/ORR reaction.

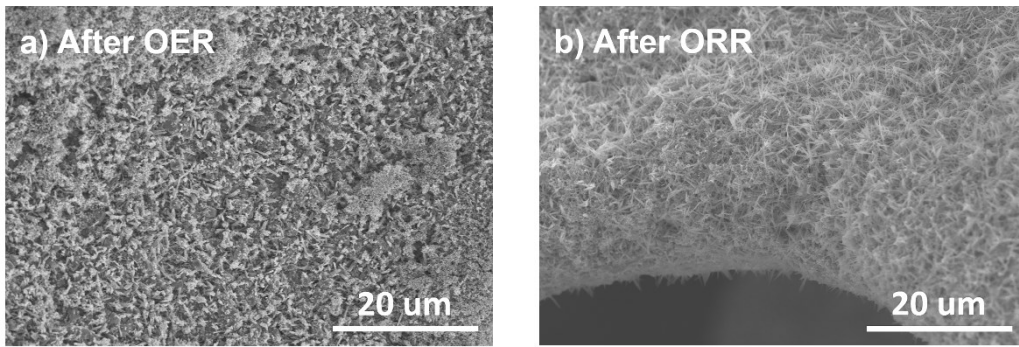


图 S6 (a) OER 反应后 Cu_3HITP_2 的 SEM 图谱; (b) ORR 反应后 Cu_3HITP_2 的 SEM 图谱

Fig. S6 (a) SEM image of Cu_3HITP_2 after OER; (b) SEM image of Cu_3HITP_2 after ORR.

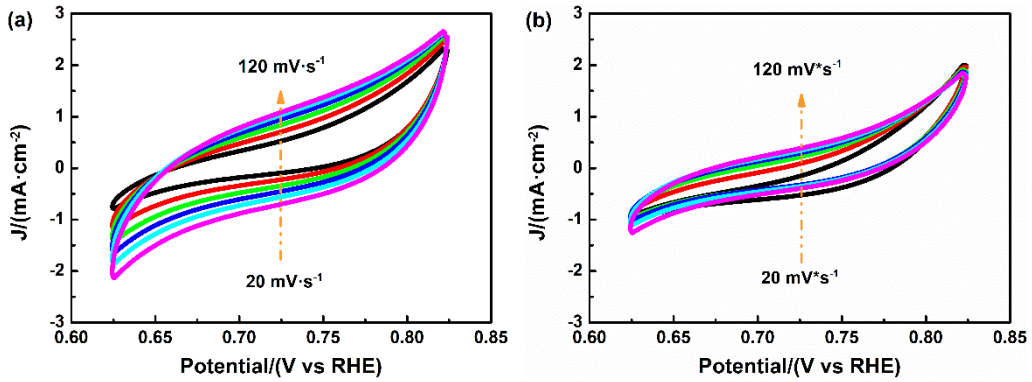


图 S7 ECSA-CV 曲线

Fig. S7 ECSA-CV curve.

(a) $\text{Cu}_3\text{HITP}_2 / \text{CF}$; (b) $\text{Cu}(\text{OH})_2 / \text{CF}$.

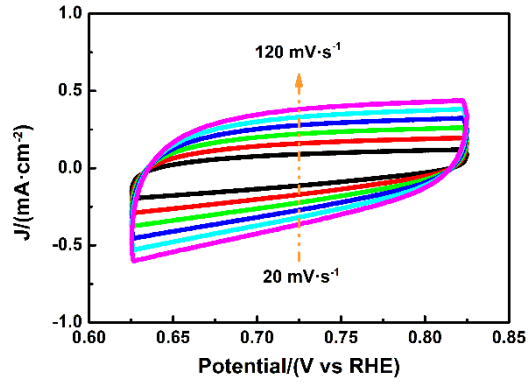


图 S8 Cu_3HITP_2 -粉末的 ECSA-CV 曲线

Fig. S8 ECSA-CV curve of Cu_3HITP_2 -powder.

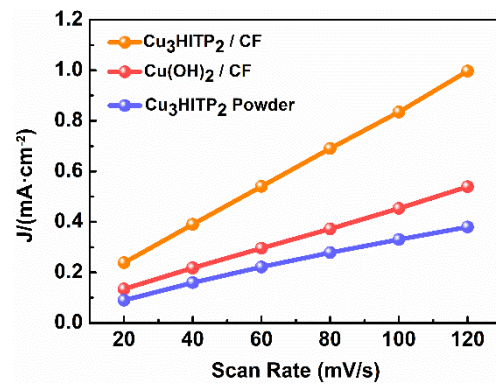


图 S9 基于 ECSA-CV 曲线的 C_{dl} 斜率图

Fig. S9 C_{dl} slope based on ECSA-CV curve.

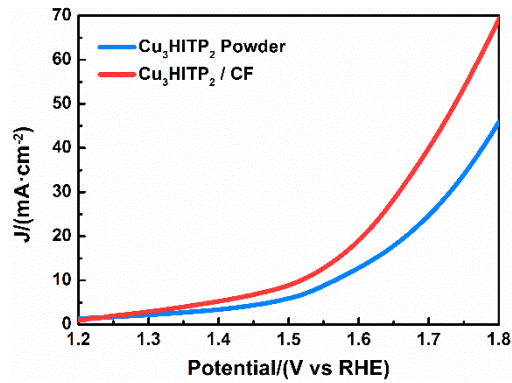


图 S10 粉末 Cu_3HITP_2 与 $\text{Cu}_3\text{HITP}_2/\text{CF}$ 的 LSV 曲线

Fig. S10 LSV curve of powder Cu_3HITP_2 and $\text{Cu}_3\text{HITP}_2/\text{CF}$.

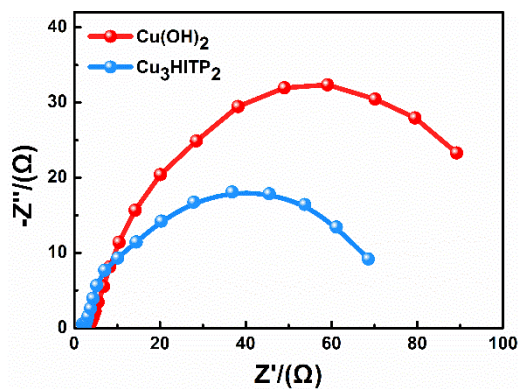


图 S11 $\text{Cu}(\text{OH})_2$ 与 Cu_3HITP_2 的 electrochemical impedance EIS 谱

Fig. S11 EIS spectra of $\text{Cu}(\text{OH})_2$ and Cu_3HITP_2 .

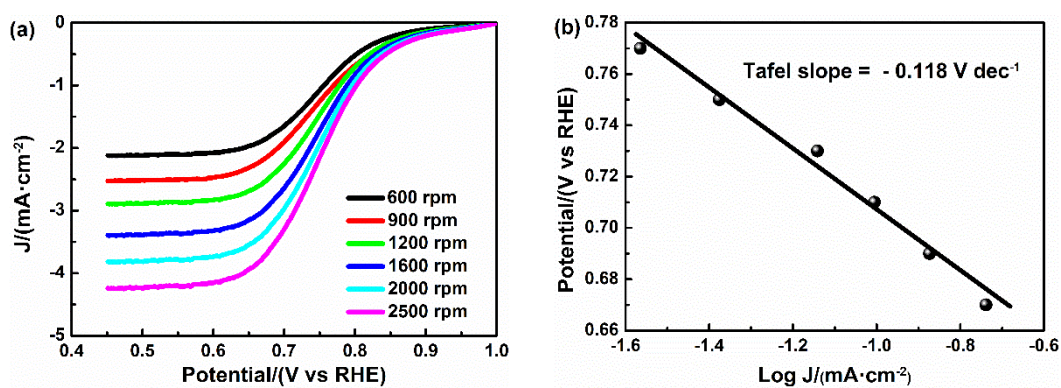


图 S12 (a) ORR 测试中不同转速下的粉末 Cu_3HITP_2 的 LSV 曲线; (b) 粉末 Cu_3HITP_2 的 Tafel 斜率

Fig. S12 (a) LSV curve of Cu_3HITP_2 -powder at different rate in ORR; (b) Tafel slope of Cu_3HITP_2 -powder.