

## **Rational Engineering of Cu-BTC/Al<sub>2</sub>S<sub>3</sub>@PPy with Improved Charge Transport and Interfacial Properties for Energy Storage and Hydrogen Evolution Reaction**

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**Supplementary Data**

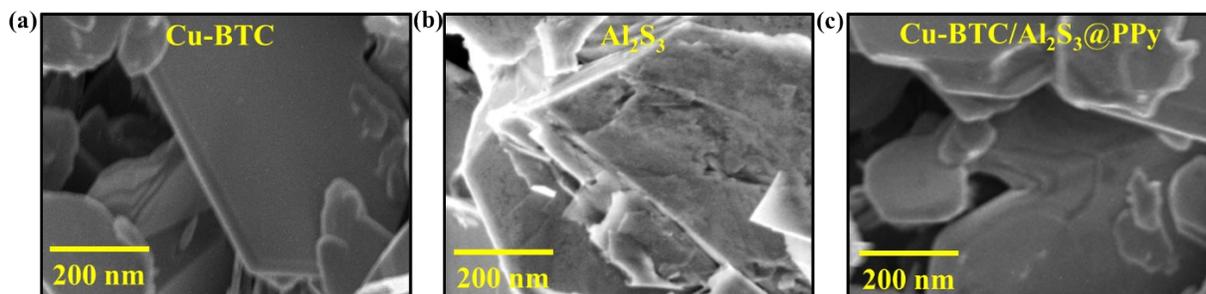


Fig. S1. SEM micrographs of (a) Cu-BTC, (b)  $\text{Al}_2\text{S}_3$ , and (c) Cu-BTC/ $\text{Al}_2\text{S}_3$ @PPy composite illustrating the surface morphology and structural integration of the individual components and the hybrid material (scale bar: 200 nm).

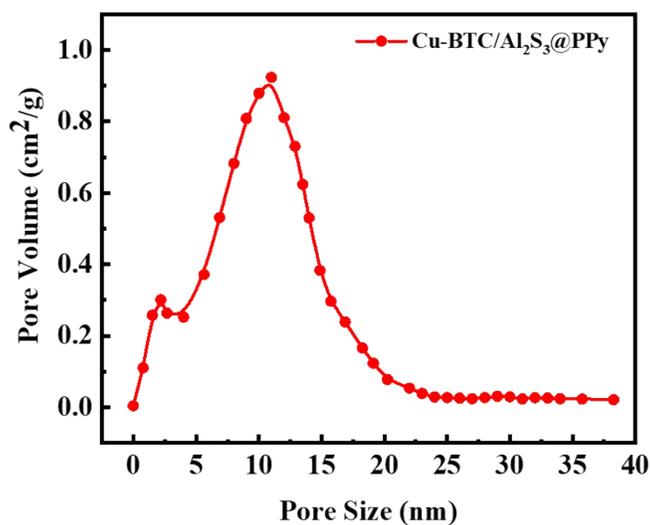


Fig. S2. BJH pore size distribution curve (desorption branch) of Cu-BTC/ $\text{Al}_2\text{S}_3$ @PPy composite confirming mesoporous diffusion pathways.