

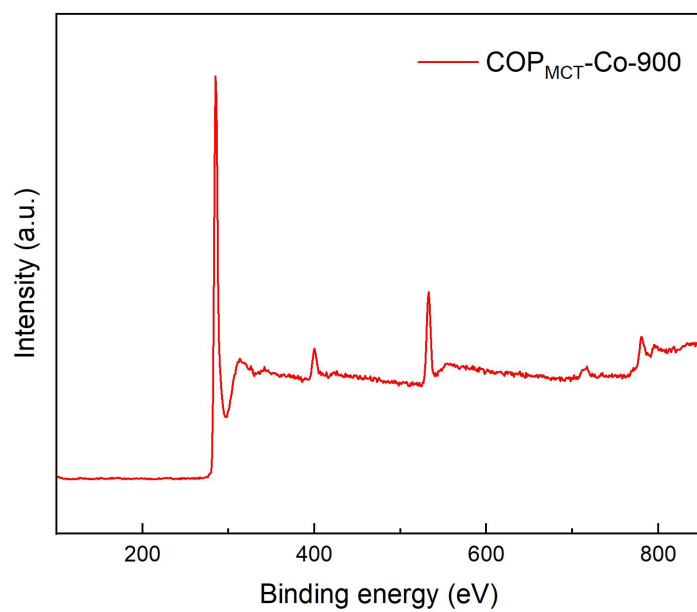
Supplementary Materials

Macrocyclic-based covalent-organic-polymer as efficient oxygen electrocatalysts for zinc-air flow batteries

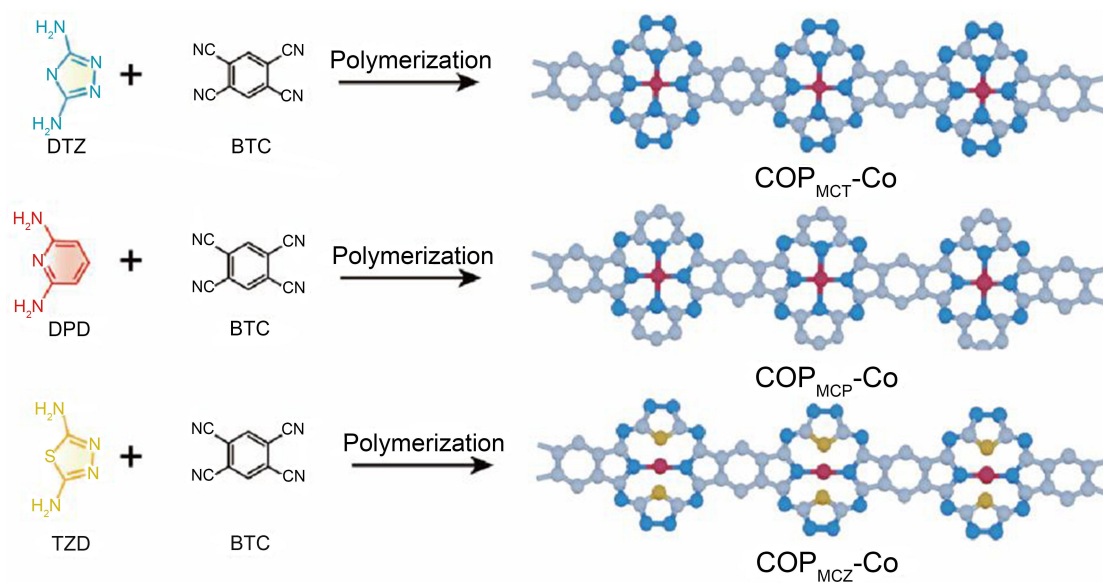
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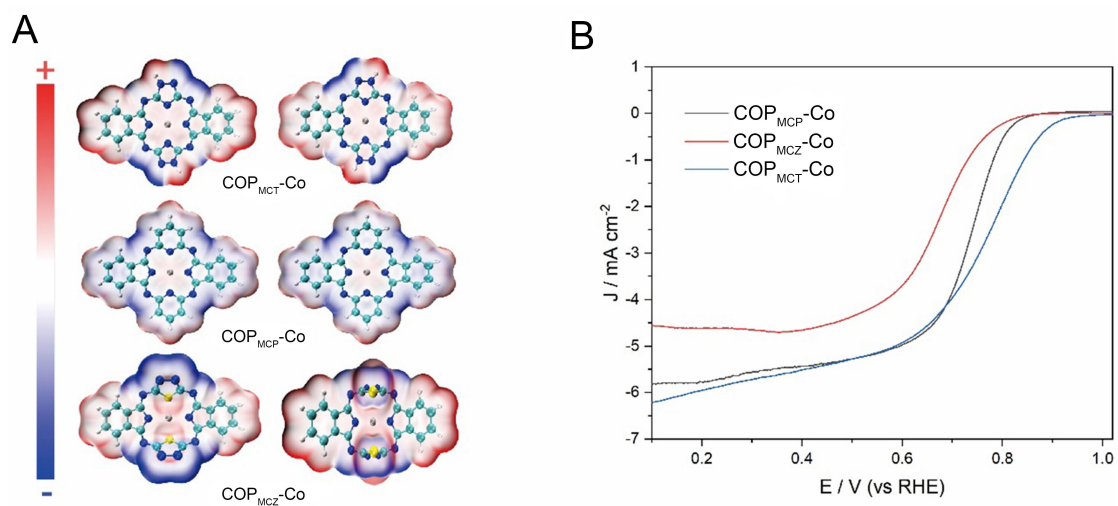
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Supplementary Figure 1. XPS spectra of the COP_{MCT}-Co-900. XPS: X-ray photoelectron spectroscopy; COP: covalent organic polymer.



Supplementary Figure 2. Schematic synthesis of three cobalt macrocyclic compounds. DTZ: 3,5-diamino-1,2,4-triazole; BTC: benzene-1,2,4,5-tetracarbonitrile; DPD: 2,6-diaminopyridine; TZD: 1,3,4thiadiazole-2,5-diamine; COP: covalent organic polymer.



Supplementary Figure 3. (A) Electrostatic potential of $\text{COP}_{\text{MCT}}\text{-Co}$, $\text{COP}_{\text{MCP}}\text{-Co}$, and $\text{COP}_{\text{MCZ}}\text{-Co}$; (B) The LSV curves of $\text{COP}_{\text{MCT}}\text{-Co}$, $\text{COP}_{\text{MCP}}\text{-Co}$, and $\text{COP}_{\text{MCZ}}\text{-Co}$. COP: Covalent organic polymer; LSV: linear sweep voltammetry.