



ION-CONDUCTIVE COVALENT ORGANIC FRAMEWORK ELECTROLYTES FOR METAL-ION BATTERIES

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Inventors: Dawei Feng, Wonmi Lee, Haochen Li

The Invention

UW-Madison researchers have developed two new classes of sulfonated -NH-linked covalent organic frameworks (COFs), specifically designed for sodium or potassium ion conduction. These COFs were synthesized through a straightforward, one-step process using affordable starting materials. These COFs were demonstrated to possess high ionic conductivity at room temperature, without the need for additional salt or solvent. This enhanced performance, including low activation energies of 0.21 eV for both i-COF-2 (Na) and i-COF-2 (K) and of 0.24 eV and 0.25 eV for i-COF-3 (Na) and i-COF-3 (K), is attributed to the strategic incorporation of sulfonate groups and the directional channels within the COF structure. The Na⁺ and K⁺ ion high conductivities, low cost and intrinsic framework stability of i-COF-2 (Na or K) and i-COF-3 (Na or K) provide promising solid electrolyte candidates for the exploration of sustainable energy storage.

Tech Fields

- [Clean Technology: Energy storage, delivery & resource efficiencies](#)

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