



## AMPLIFICATION OF INTERFACIAL CAPACITANCE IN IONIC LIQUID ELECTROLYTES

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### The Invention

UW-Madison researchers have identified ionic liquid and dopant combinations that enable increased capacitance. In short, the interfacial capacitance of ionic liquid electrolytes at electrode surfaces is greatly enhanced via the incorporation of redox active metal ions into the electrolytes. Application of these combinations could be used to increase energy density in a variety of electrochemical devices, including supercapacitors. Exemplary combinations include binary mixtures of the ionic liquid 1-butyl-4-methylimidazolium bis[(trifluoromethyl)sulfonyl]imide (BMImTFSI) and metal salts (e.g., Li, Na, K, and Mg) as well as ternary mixtures containing two metal salts in BMImTFSI. These mixtures increase capacitance by >350% under certain conditions. In practice, these enhancements can be realized using underpotential deposition of the mixture on a porous metal electrode.

#### Tech Fields

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

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