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Amidinium salts: Towards enabling electrochemistry in non-polar media from alkanes to ionic liquids

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Abstract

There is little known about electrochemical behavior in non-polar media due to lack of compatible, hydrophobic salts. In this work, this difficult challenge has been overcome by following a strategy based on designing and synthesizing a novel family of organic salts with highly-delocalized cations and anions. The salts are based on the amidinium cation with highly-delocalized positive charge and long alkyl groups that enable good miscibility in heptane, an archetypical, non-polar media, while being hydrophobic, room-temperature ionic liquids. The electrolyte solutions show ionic conductivities that span the range 10^{-11} – 10^{-4} S cm⁻¹ and electrochemical activity which enable their application as antistatic agents and also as new type of hydrophobic electrolytes in various electrochemical devices.

Graphical abstract

