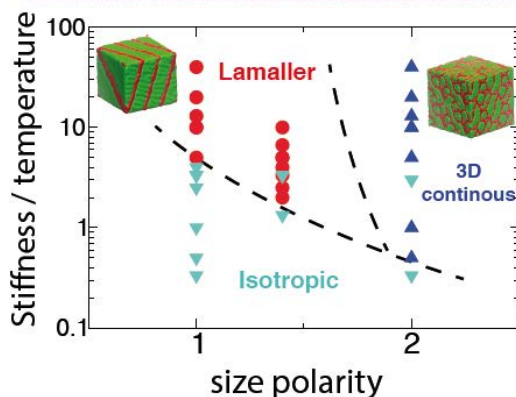
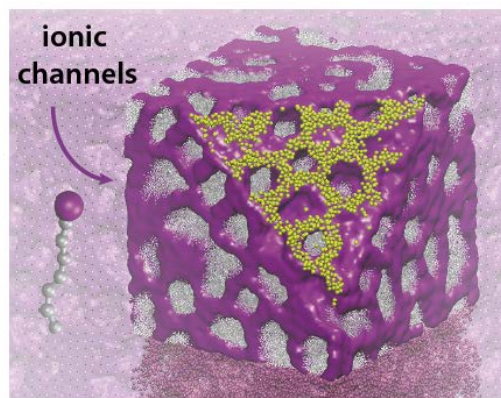


Morphological phases in ionic liquids induce high conductivities at low temperatures



3D morphological phases with ion conducting channels (yellow spheres) emerge in ionic liquids with increasing size polarity along molecules. The stiffer the molecular tails are, the higher the ionic conductivity is.

A. Erbas, M. Olvera de la Cruz, PCCP, 2016

DOI: [10.1039/C5CP07090B](https://doi.org/10.1039/C5CP07090B)

Work was performed at Northwestern University

Scientific Achievement

by adjusting stiffness and steric interactions of the amphiphilic ionic liquid (IL) molecules, we showed that ion-conducting lamellar or 3D continuous phases can be obtained in dry IL melts at ambient temperatures

Significance and Impact

ILs have been emerging components in many electrochemical applications, particularly for energy storage (e.g., as electrolytes in batteries). Our findings can help improve the design principle of more efficient IL systems and understand the experimental data in literature better.

Research Details

- Using extensive molecular dynamics simulations, temperature dependence, properties of polymeric tail and excluded volume symmetry of the amphiphilic molecules and formation of ionic channels in ILs with no solvent (dry) are investigated in large scale model systems by considering both short and long-range Coulomb interactions.



U.S. DEPARTMENT OF
ENERGY

Office of
Science



Center for Bio-Inspired Energy Science