

Abstract Submitted
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A silica nanoparticle based ionic material¹ NIKHIL FERNANDES, ZUBAIR AZAD, EMMANUEL GIANNELIS, Cornell University — We report an ionic fluid consisting of silica nanoparticles as the anion, and amine-terminated polyethylene glycol as the cation. Unlike previous work that has required chemical functionalization of the silica surface, the charge on the nanoparticle anion is carried by the intrinsic surface hydroxyls, simplifying the synthesis, and thus making this a simple test system to probe the physics of these nanoscale ionic materials. Charge and steric factors result in excellent dispersion of the nanoparticles in the polymer matrix. The resulting material is a soft glass that has thermal and rheological properties that depend on the silica:polymer ratio. In particular, at a critical silica:polymer ratio, the ionic material shows a significant depression of the normalized heat of melting and the melting temperature compared to samples with higher or lower silica content (showing eutectic-like behaviour), and to controls without the ionic interaction between the polymer and the particle.

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