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Self-Assembly of Pluronic Polymers in Protic Ionic Liquids

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Development of alternate templating for mesoporous metals can contribute to various areas, including the development of novel battery electrodes and catalyst scaffolds. Due to their sol-gel properties and drastic rheology changes with temperature at high concentrations, Pluronic triblock copolymers in ionic liquids could potentially be used for templating applications. A high throughput study was conducted using Small Angle X-ray Scattering to understand the nanostructure of the self-assembly of Pluronic polymers as a function of ionic liquid solvophobicity. Representative Pluronic triblock copolymers with varying PEO block lengths, F127 (PEO106–PPO70–PEO106), P123 (PEO20–PPO70–PEO20) and L121 (PEO5–PPO70–PEO5) were investigated in the nitrate based protic ionic liquids of ethylammonium nitrate (EAN), ethanolammonium nitrate (EtAN) and propylammonium nitrate (PAN) using the SAXS/WAXS beamline at the Australian Synchrotron. Complex phase behaviour was observed in the polymer/ionic liquid compositions, with the solvophobicity of the ionic liquids having a noticeable effect on the formation of higher order phases.

References

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