Supporting Information

Many Protic Ionic Liquids Mediate Hydrocarbon-Solvent Interactions and Promote Amphiphile Self-Assembly

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Preparation of protic ionic liquids. Equimolar amounts of the acid were added slowly whilst stirring to the appropriate amine contained in a round bottom flask over ice. The temperature during reaction was maintained below 40ºC in most cases. Excess water was removed by drying under vacuum at >0.01 Torr. The final products were typically hygroscopic and required vacuum freeze drying immediately prior to use.

Penetration scans and optical microscopy. For each PIL-CTAB combination a penetration scan was conducted, where CTAB was placed between a microscope slide and a coverslip, then for a liquid PIL a drop of the PIL was placed on one edge of the coverslip (for a PIL that was solid at room temperature, solid material was placed at the edge of the coverslip). The samples were heated at 2-10^{0}C/min in a Mettler FP82HT hot stage controlled by a FP90 central processor. A surfactant concentration gradient was established by penetrating liquid PIL, and the relevant part of the slides were sealed to avoid moisture uptake and kept overnight to allow the phases to develop. The different liquid crystalline phases for each PIL/surfactant combination as a function of temperature were identified based on their characteristic birefringent texture using polarized light microscopy (PLM). Olympus IMT-2 and Olympus IX 70 microscopes equipped with cross polarising lenses were used for the analysis.

Melting Point. The melting points were determined by differential scanning calorimetry (DSC), using a Mettler 3000 system under a nitrogen atmosphere. The samples were run in an aluminium pan in a sealed furnace, and were cooled to -150^{o}C before heating at rates of 2.5^{o}C/min.

Surface Tension. Surface tensions of the pure PILs were measured using the du Nöuy ring method at 27ºC.