

Abstract Submitted
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The Amphiphilic Character of Cellulose Molecules in True Solution in Solvent Mixtures Containing Ionic Liquid and its Utilization in Emulsification SOFIA NAPSO, YACHIN COHEN, DMITRY REIN, RAFAIL KHALFIN, Technion, Israel, NOEMI SZEKELY, Forschungszentrum Juelich, Germany — Cellulose is the most abundant renewable material in nature that is utilized as a raw material for fabrication of synthetic products. Although it is not soluble in common solvents, there is significant interest in the use of solvent mixtures containing ionic liquids (IL) and polar organic solvents for cellulose dissolution. We present evidence for true molecular dissolution of cellulose in binary mixtures of common polar organic solvents with an ionic liquid, using cryogenic transmission electron microscopy, small-angle neutron-, x-ray- and static light scattering. In particular, the measured low values of the molecular, gyration radius and persistence length indicate the absence of significant aggregation of the dissolved chains. We conjecture that the dissolved cellulose chains are amphiphilic. This can be inferred from the facile fabrication of cellulose-encapsulated colloidal oil-in-water or water-in-oil dispersions. This may be done by mixing water, oil and cellulose solution in an ionic liquid. A more practical alternative is to form first a hydrogel from the cellulose/ionic liquid solution by coagulation with water and applying it to sonicated water/oil or oil/water mixtures. Apparently the dissolution/ regeneration process affords higher mobility to the cellulose molecules so an encapsulation coating can be formed at the water-oil interface.

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