Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Charged colloids in low polar solvents ANDREW HOLLINGSWORTH, MIRJAM LEUNISSEN, WILLIAM IRVINE, PAUL CHAIKIN, New York University, ALFONS VAN BLAADEREN, Utrecht University — In a low polar environment, sterically-stabilized poly(methyl methacrylate) spheres become positively charged and exhibit extraordinary long-range repulsive interactions. Confocal microscopy shows that they can form low density, body centered cubic crystals with lattice constants up to 40 microns. We attribute this behavior to the cyclohexyl bromide (CHB) in which the colloidal particles are suspended. CHB is a desirable solvent due to its density matching capability; however, it is difficult to purify. Trace amounts of the hydrogen halide resulting from the hydrolysis of CHB apparently interact with the stabilizer layer, imparting charge to the colloids. Surprisingly, water can also be used to deionize the organic solvent, depending on the relative amounts of the two fluids. The addition of quaternary ammonium salts was used to screen charge (reducing long range particle interaction). Ionic strengths were computed using ionic association theory; in turn, particle charge and surface potentials were estimated from electrokinetic measurements.

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Date submitted: 27 Nov 2007 Electronic form version 1.4