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Charged Colloids Near an Oil-Water Interface: Collossal Crystals and Colloidosomes W.B. RUSSEL, Princeton Univ., M.E. LEUNISSEN, A. VAN BLAADEREN, Soft. Cond. Matt, Debye Inst., Utrecht Univ., Netherlands, A.D. HOLLINGSWORTH, M.T. SULLIVAN, P.M. CHAIKIN, Princeton Univ. — In a cyclohexyl bromide (CHB)-decalin mixture sterically stabilized PMMA spheres have a positive charge. Together with a Debye screening length of several microns this results in long-ranged repulsive interactions. Water forms a stable interface with CHB and, with its high dielectric constant, absorbs ions from the oil phase. This reduces the screening even further and leads to 'Coulombic' crystals with extreme lattice constants (tens of microns). The oil-water interface often is charged, repelling the similarly charged particles in the oil phase, leaving a large zone depleted ($\sim$ 50 microns). However, independent of the sign or magnitude of interfacial charges, at short range the attraction between the charged particle and its image, in the higher dielectric constant water, dominates. Thus, the charged hydrophobic particles get permanently bound to the interface, forming a 2D 'surface crystal'. The crystal density can be controlled with an electric field that drives the particles to the surface. Using the specific properties of this particle-oil-water system we can make particle-coated droplets ('colloidosomes'), geometric particle packings enveloped by a water sheath and particle transporting channels.

Mirjam Leunissen
Utrecht University

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