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Inversion of the electric field driven by ionic solvation energy¹ GUILLERMO GUERRERO GARCIA, Northwestern University, Department of Materials Science and Engineering, Evanston, IL 60208, FRANCISCO SOLIS, School of Mathematical and Natural Sciences Arizona State University Glendale, AZ 85306, MONICA OLVERA DE LA CRUZ, Northwestern University, Department of Materials Science and Engineering, Evanston, IL 60208 — In previous studies, Monte Carlo simulations have suggested the possibility of inverting the electric field near a liquid/liquid interface due to excluded volume effects, ionic size asymmetry, and image charges at high electrolyte concentrations in the absence of ion transfer. In this work, we develop a mean field theory and coarse grained simulations to study the ion transfer between the two immiscible electrolytes in the presence of an electric field. Our calculations suggest a novel mechanism to invert the electric field near confined oil/water interfaces based on differences of the ionic solvation energy in both liquid media.

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