

Abstract Submitted
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Ion-Specific Induced Charges at Aqueous Soft Interfaces¹ WEN-JIE WANG, ALEX TRAVESSET, DAVID VAKNIN, Ames Laboratory, and Department of Physics, Iowa State University, Ames, Iowa 50011 — Surface-sensitive X-ray scattering and spectroscopic techniques are employed to monitor ion binding specifically to Langmuir monolayers of densely packed carboxyl or phosphate groups. By systematically varying pH of Fe^{3+} , Fe^{2+} and La^{3+} solutions, we show that the critical surface pressure at the tilted (L2) to untilted (LS) transition is ionic specific and pH dependent. While the maximum density of surface bound La^{3+} per carboxylic group is ~ 0.3 , the amount necessary to neutralize the fully charged surface, for Fe^{3+} it is nearly 0.6. Furthermore, the binding of Fe^{3+} is accompanied with a significant accumulation of Cl^- co-ions implying interfacial charge inversion. Similar experiments with charged phosphate groups at the interface show that the bindings of Fe^{2+} and La^{3+} are electrostatically driven. Our results have implications on biomineralization processes and ionic functions at cell membranes.

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