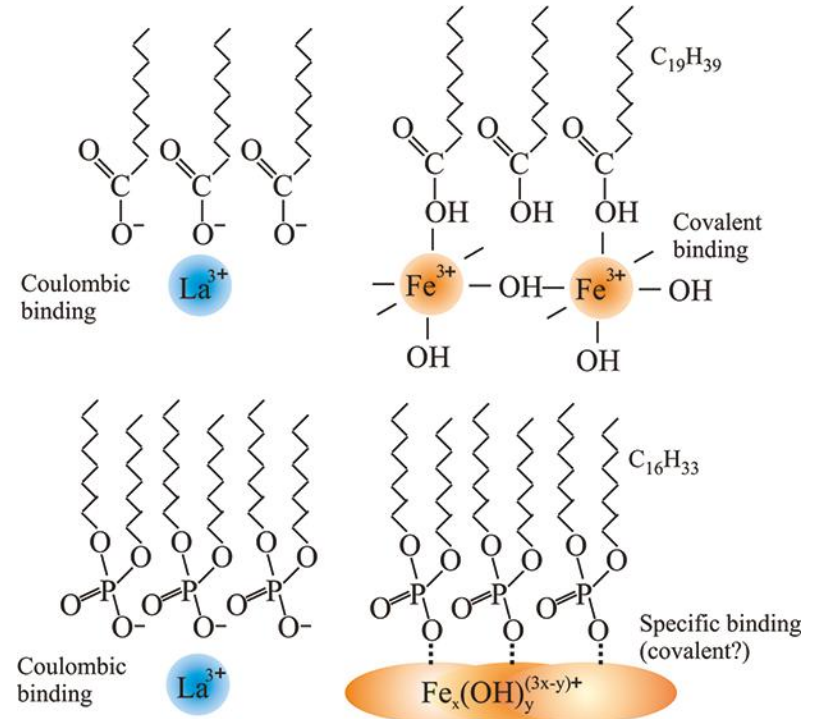# Ionic Specificity in pH Regulated Charged Interfaces: Fe^{3+} versus La^{3+}

Wenjie Wang, Rebecca Y. Park, David H. Meyer, Alex Travesset, and David Vaknin*

Ames Laboratory, and Department of Physics and Astronomy, Iowa State University, Ames, Iowa 50011, United States
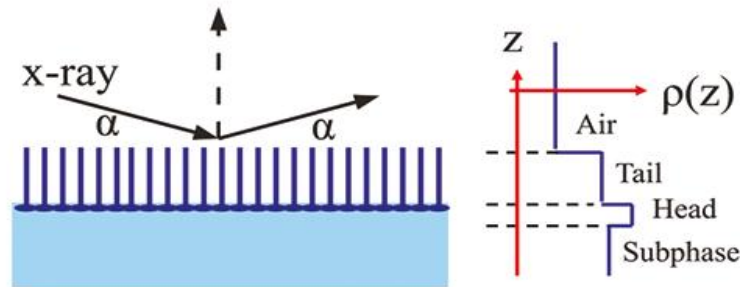
ABSTRACT

Determining the distribution of two trivalent ions Fe3+ and La3+ next to two different amphiphilic charged interfaces as ions or complexes, consisting of the phosphate lipid dihexadecyl phosphate (DHDP) and the fatty acid arachidic acid (AA)
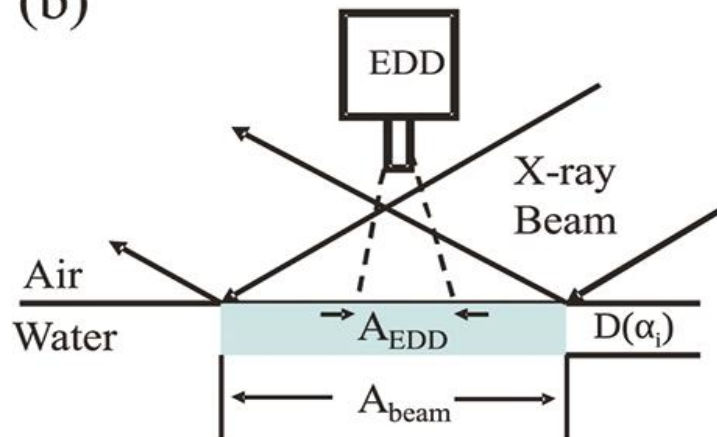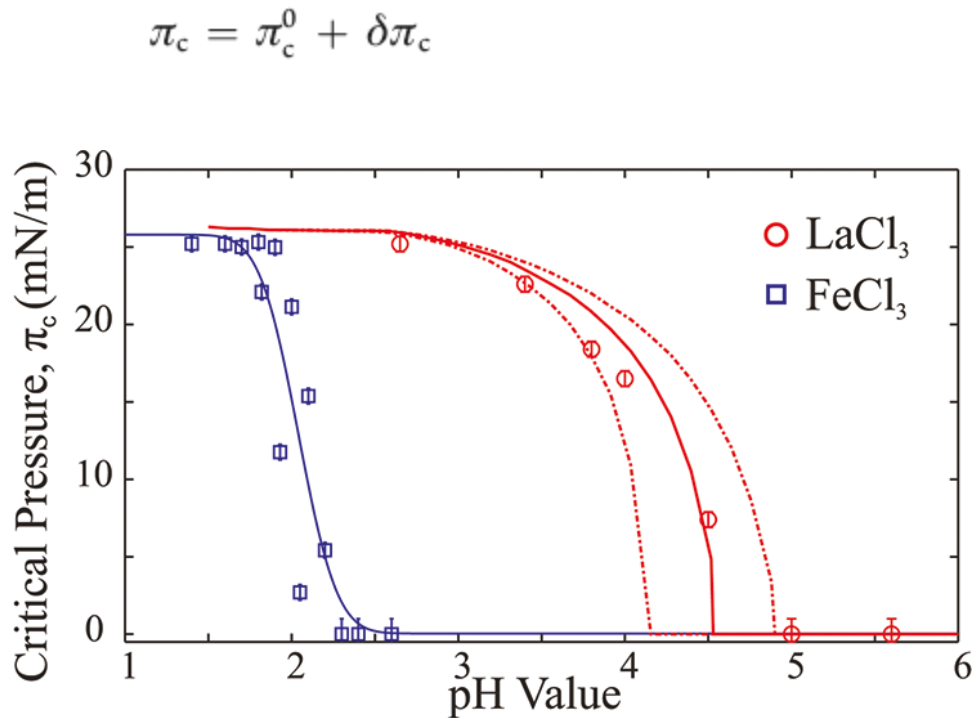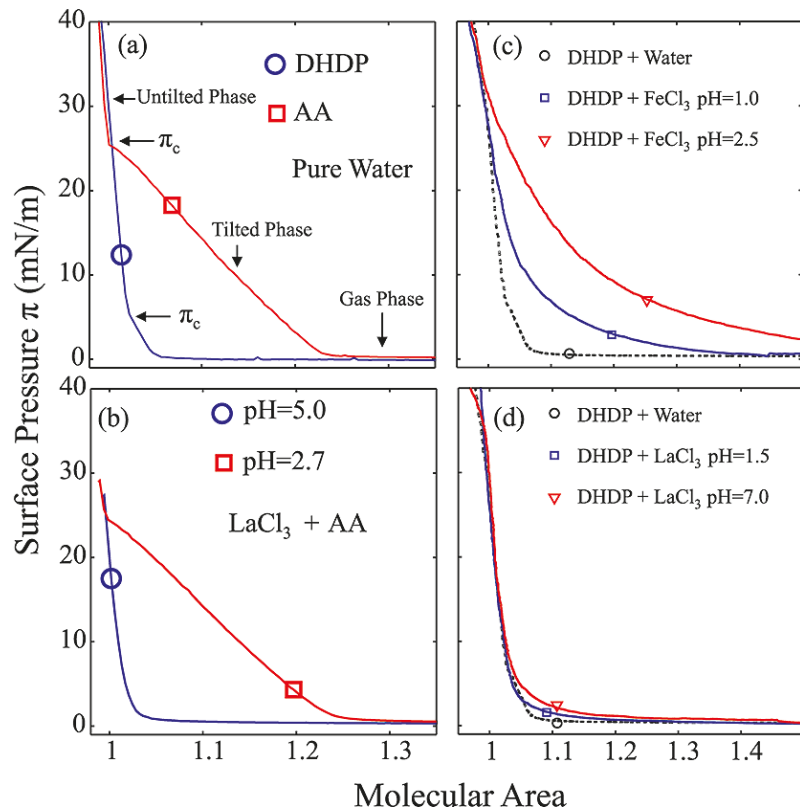
INTRODUCTION

$$[Fe^{3+}][(OH)^-]^3 = K_{sp}$$
$$[Fe(OH)^{2+}] = K_1[Fe^{3+}][(OH)^-]$$
$$[H^+][(OH)^-] = K_{pH}$$
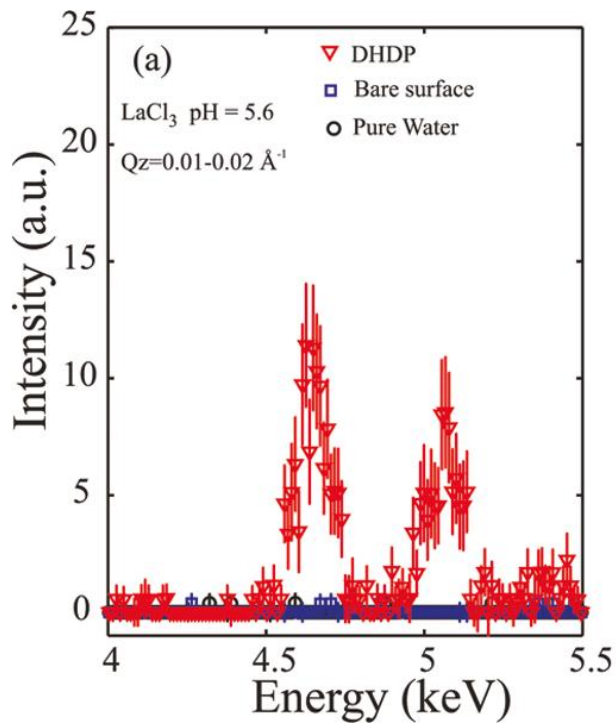

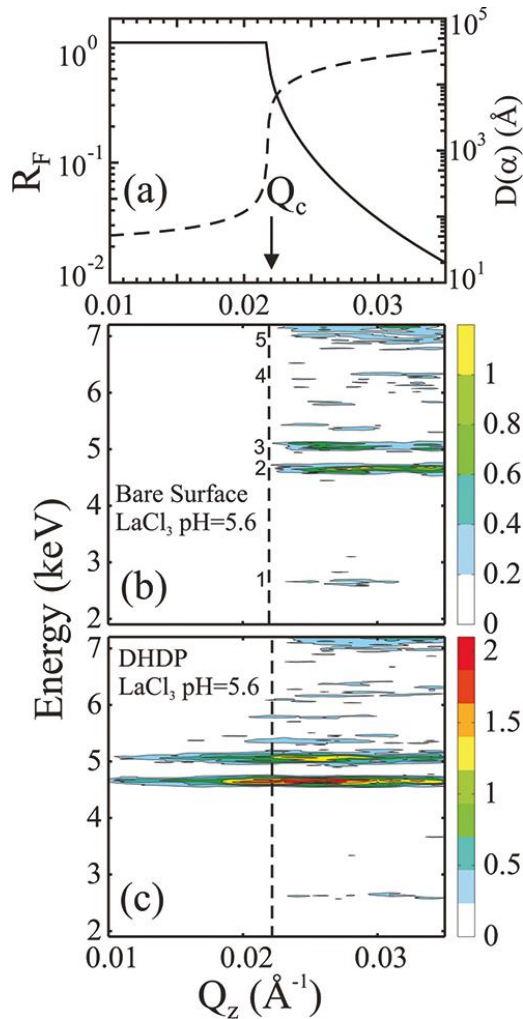$$Q_z = 4\pi \sin\alpha / \lambda$$
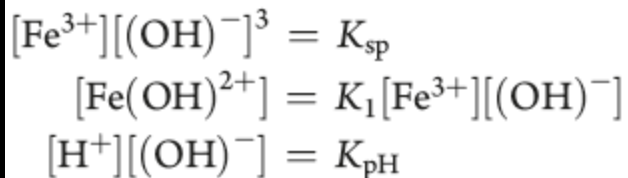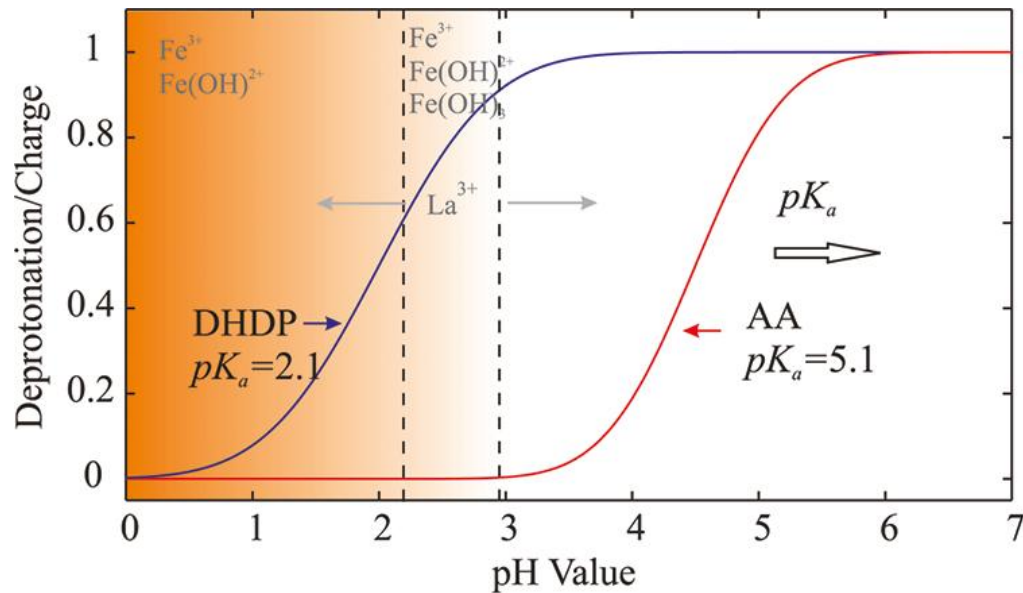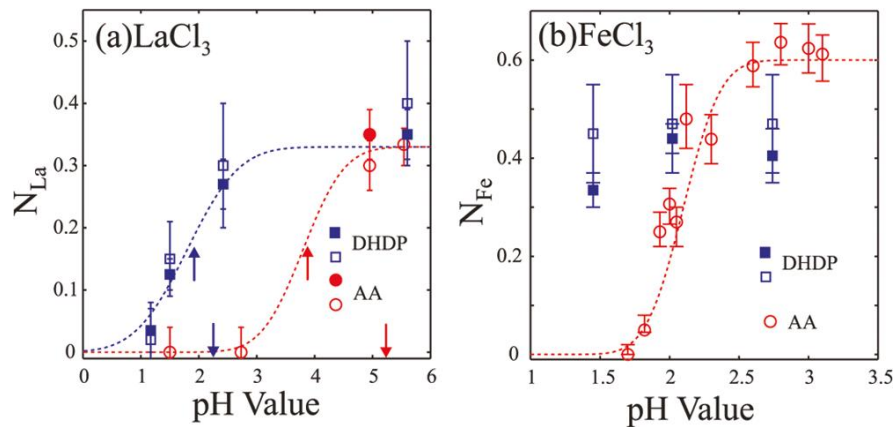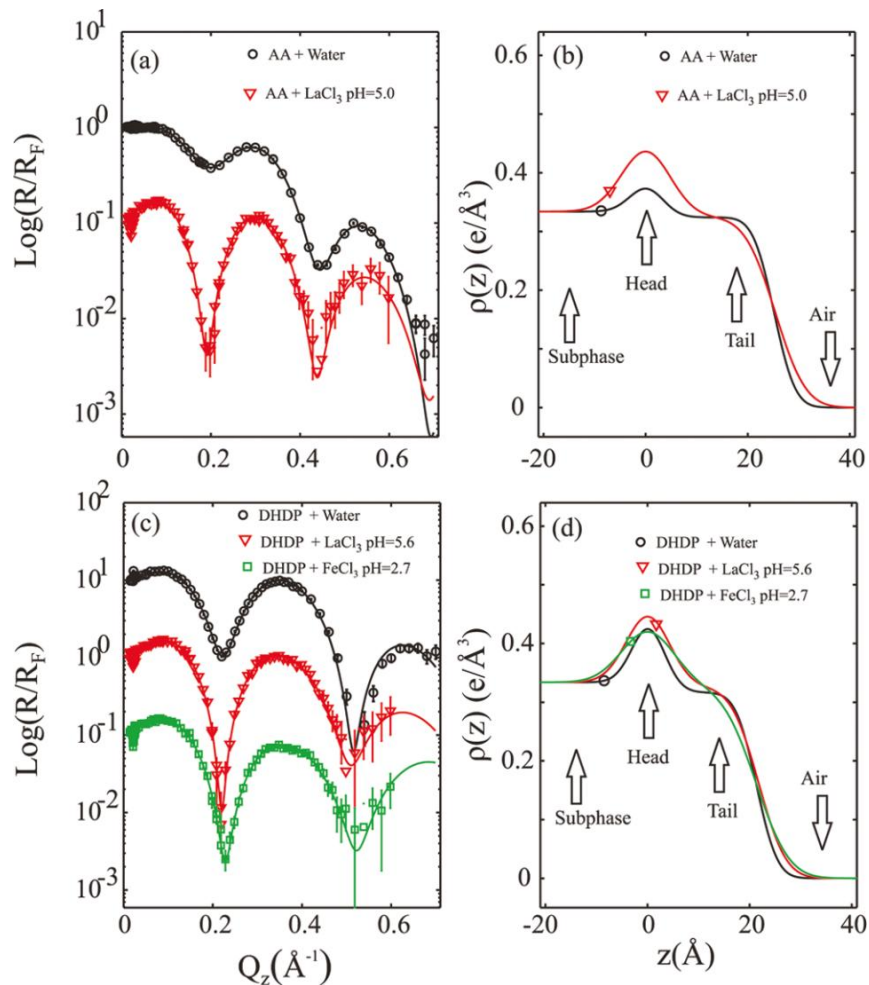
EXPERIMENTAL DETAILS

Surface Pressure Isotherm

X-ray Fluorescence
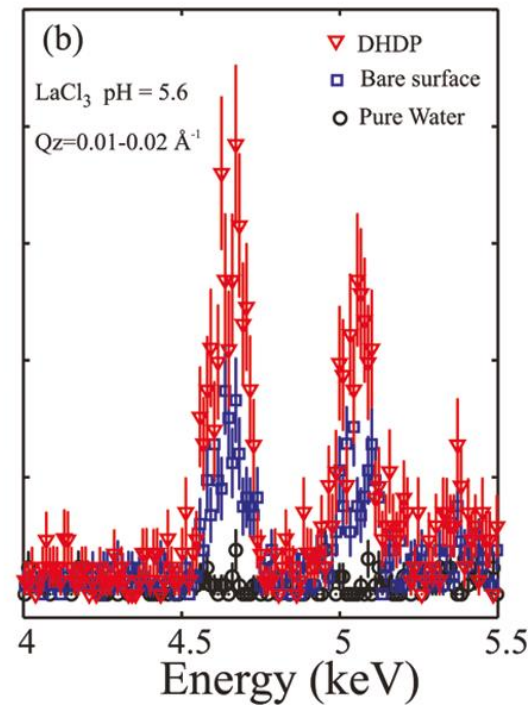
X-ray Reflectivity

CONCLUSIONS

1. Fe3+ and La3+ lead to different interfacial structures upon binding

2. La3+ is an ion amenable to a description within standard statistical mechanics, Fe3+ is not

3. pH manipulation regulates the interfacial charge and the ion species in the bulk

4. The amount of surface bound Fe(III) to the interface exceeds the amount necessary to neutralize the interface