

Abstract Submitted
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Determination of Thermodynamic Surface Properties of Carboxylic Acid Functionalized Silanes at Silica/Water Interfaces with Second Harmonic Generation MICHAEL MUSORRAFITI, CHRISTOPHER KONEK, HIND AL-ALBADLEH, PAUL BERTIN, SONBINH NGUYEN, FRANZ GEIGER, Northwestern University — Using the $\chi^{(3)}$ method of second harmonic generation, we report surface pK_a values for a monoprotic carboxylic acid functionalized silica/water interface. We observe two pK_a values at 9(1) and 5.6(2). The acidic pK_a is similar to pK_a values of organic acids in solution. The more basic pK_a is consistent with lateral hydrogen-bonding stabilization among the interfacial carboxylic acid groups. From the measured data, we obtained relative surface potentials and surface charge densities. Using these values in the Lippmann equation, we can track the changes in interfacial energy relative to the neutral reference state over seven orders of magnitude, from 10^{-7} mJ/m² to several mJ/m².

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