

Abstract template:

**Title**

Aqueous Solution/Air Interfaces Probed with Sum Frequency Generation Spectroscopy

**Reference**

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**Authors**

Shultz, Mary Jane; Baldelli, Steve; Schnitzer, Cheryl; Simonelli, Danielle

**Abstract**

An important issue for developing a molecular-level mechanism of heterogeneous interactions at the aqueous interface is determining changes in the interface with changes in the bulk composition. Development of the nonlinear spectroscopy, sum frequency generation (SFG) provides a technique to probe these changes. Several molecular and ionic solutes have been used to investigate changes in the structure of the aqueous interface. Molecular solutes include glycerol and ammonia. Ionic and associated ion complexes include sulfuric acid as well as alkali sulfate and bisulfate salts. Molecular solutes and associated ion complexes penetrate to the top monolayer of the aqueous-air interface displacing water from the interface. Specifically, the conjectured ammonia-water complex is observed with ammonia tilted, on average, 25-38° from the normal. Ionic solutes generate a double layer in the interfacial region due to the differential distribution of anions and cations near the interface. The strength of the double layer is dependent on ion size and charge. Due to the extreme size of the proton, the strongest field is generated by acidic solutes. As the ionic solute concentration increases, associated ion pairs form and these penetrate to the top monolayer. These results have wide implications because the aqueous interface is ubiquitous in atmospheric and biological systems.