Chilling Out: Understanding the Adsorption and Uptake of Atmospheric Gases At Cold Aqueous Surfaces

Geri Richmond

Department of Chemistry
University of Oregon
Eugene, OR 97403

With recent technological advances in the experimental and computational tools that we now have available to probe and prod the surface of water, we are obtaining a deeper understanding of its molecular characteristics and what role it plays in many environmentally important processes on a water surface. In this presentation I will provide an overview of our most recent results in which we explore the adsorption and reactivity of atmospherically relevant gases and organics on aqueous surfaces. Our studies employ a combination of nonlinear spectroscopic techniques, thermodynamic measurements and molecular dynamics simulations. Examined over a range of temperatures relevant to atmospheric conditions, the studies provide unique new insights into the approach of the gas to the surface, gas-surface complexation, the relationship between these surface complexes and gaseous uptake, the effect of organic films on gas adsorption and reactivity, and the role of surface water molecules these processes.