OMICS Group Conferences
Accelerating Scientific Discovery
3rd International Conference on
Nanotek & Expo
December 02-04, 2013 Hampton Inn Tropicana, Las Vegas, NV, USA

Understanding the freezing of water on surfaces at the nanoscale to control ice formation at the macroscale

Albert Verdaguer
ICN2 - Institut Catala de Nanociencia i Nanotecnologia, Spain

Freezing of liquid water at the troposphere is usually activated by a particle or surface, in a process called heterogeneous nucleation. The water-surface interactions determine the efficiency of a surface to induce ice nucleation. Researchers have been searching for materials to efficiently control ice nucleation. Although the phenomenon has been studied for decades, its molecular basis remains poorly understood. Thanks to the development of scanning probe microscopy (SPM), the structures of water films on surfaces have begun to be determined at cryogenic temperatures (in vacuum) conditions and under ambient conditions. By studying water structures on surfaces at ambient conditions, we aim to establish whether the surface properties believed to enhance ice nucleation are relevant for efficient surface ice nucleation at the macroscale. These studies should help researchers to identify and predict the properties-and by extension, the substrates-that most efficiently nucleate ice. Our group is currently endeavouring to advance knowledge in this area as well as to exploit state-of-the-art self-assembled monolayer (SAM) technology to fabricate coatings that can convert a surface into an efficient ice nucleator.

Biography

Albert Verdaguer completed his Ph.D. in Physics in 2001 at the University of Barcelona. His doctoral thesis dealt with computer simulation of liquids. He spent two years at the Nanometric Techniques Unit of the Scientific-Technical Services of the University of Barcelona, using scanning probe microscopy (SPM) techniques in a wide range of different studies. He continued his postdoctoral research at the Lawrence Berkeley National Laboratory (California, USA), focusing on imaging water films at the nanoscale with SPM. In 2006, he moved to his current institution, ICN2, in Barcelona, Spain. He is presently in charge of two research lines, one on development of SPM techniques and another, on studying water films on surfaces at the nanoscale.

averdaguer@cin2.es