Water: From the Ice to the Nano Age

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Water is an interesting material. It contracts upon heating, it has a high heat capacity and diffuses faster when crowded. These together with the more than seventy anomalies can be understood in terms of two length scales interaction potential. This two length scales represent the open and close structures formed by two tetramers interacting. The existence of these bounding and non bonding tetramers can be used to explain the density, diffusion and the other more than seventy anomalies of water. This simplified picture of water allow us to understand the relevance of water in the biological systems, in the balance of the climate and in the history of earth. In this talk we use technology and science inspired by nature to propose ways to obtain more clean water. The idea is to add a third scale to water: nano confinement. Two processes will be proposed. First, superhydrophilic materials will be used to collect water from air. Next by nano structures will be proposed to separate water from salt. Finally we will present a number of scenarios in which nano can be the process for cleaning water. We will also show how this idea can be used in the current reverse osmosis desalination plants with more efficiency.