

Webinar on

# Advancements in Informatics Engineering & Research

January 29, 2022 | Webinar

## Chemically Enhanced Phase Change Heat Transfer

That water is one of the best known heat transfer fluids for phase change devices is a well accepted fact. Unfortunately its use is sometimes limited because it reacts with metal surfaces creating non-condensable gases (NCGs) leading to severely reduced heat transfer and often very high pressures. The focus of this talk will be on how a water solution can be designed to work with steel or aluminum and can be shown to enhance the heat transfer performance up to a factor of two in copper based devices. The importance of phase change heat transfer devices and the motivation behind extending the compatibility of water as a working fluid to aluminum and steel will be discussed. In aluminum, the generation of NCGs leads to failure in minutes whereas in steel the degradation is on the order of 10% per year. Though widely used with copper, aluminum/water devices are desired due to the reduced weight and cost of the material that can benefit almost any application. Use of steel is important for use in recuperators at power plants where many years of operation without degradation is vital. In these cases, enhanced performance is nice but being able to use water is most important. In copper, the enhancement is most important and needed for dealing with many electronics thermal management problems. For energy storage, getting the energy in and out with minimal temperature drop is important to its overall efficiency and this makes performance of a heat transfer device very important.

### Biography

Dr. Ivan Cotton obtained her Ph.D in Mechanical Engineering from Stanford University in 2012. He is an Assistant Professor of Mechanical and Aerospace Engineering and Biomedical Engineering at California State University, Long Beach. He was a postdoctoral scholar at Stanford Computer Science and a visiting assistant professor at University of Tokyo.

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