**Hydrophilic Zeolite Coatings for Improved Heat Transfer at the Liquid-Solid Interface**

*Ronnie A. Munoz Jr., Derek Beving, and Yushan Yan*

Many industrial processes require the transfer of heat from a surface to water. In most cases an increase in the heat transfer rate across the solid-liquid boundary means higher system efficiency and lower energy consumption. The evaporation time and wetting limit temperature for a water droplet on the surface of a bare, Zeolite-A-coated, or ZSM-5-coated stainless steel substrate have been experimentally studied. Three stainless steel substrates are prepared with different finishes. The surface finishing of a substrate is shown to cause observable changes in the wettability of a bare or ZSM-5-coated surface. Contact angle measurements reveal that Zeolite-A coatings are the most hydrophilic and that bare stainless steel is the least hydrophilic. The evaporation time and wetting limit temperature of a water droplet placed on the surface of the bare and coated substrates are examined as surface temperature increases. The zeolite coatings decrease the evaporation time and increase the wetting limit temperature on the bare stainless steel substrate, with Zeolite-A coatings offering the best improvement. For the bare substrate and the substrates coated with the same zeolite, as hydrophilicity increases, the evaporation time decreases and wetting limit temperature increases.