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Superhydrophilic - Superhydrophobic Transition in Vertically Aligned Titania Nanotubes OOMMAN VARGHESE, RAM NEUPANE, MAGGIE PAULOSE, University of Houston — Both hydrophilic (wetting) and hydrophobic (non-wetting) surfaces find applications in a variety of technological areas. For example, hydrophilic surfaces are used in microfluidic devices to provide antifogging and antifouling functions whereas hydrophobic coatings are used in clothes to attribute stain resistance. While in superhydrophilic surfaces the contact angle that water droplets make with the surface is nearly zero, the surfaces that make contact angles greater than about 120° are considered superhydrophobic. Oxide ceramics generally exhibit hydrophilic behavior. Surface texturing or organic coatings are often used to make the surface hydrophobic or superhydrophobic. We prepared highly ordered titania nanotube arrays on titanium foils using anodic oxidation that showed superhydrophilic behavior upon fabrication. We noticed a strong correlation between fabrication conditions and the wettability. We have become successful in converting such a superhydrophilic nanostructure into superhydrophobic without modifying the surface with organic molecules or texturing. Contact angles in excess of 145° have been obtained. We will present these results and discuss the physiochemical processes that decide wetting properties of oxide nanostructures.

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