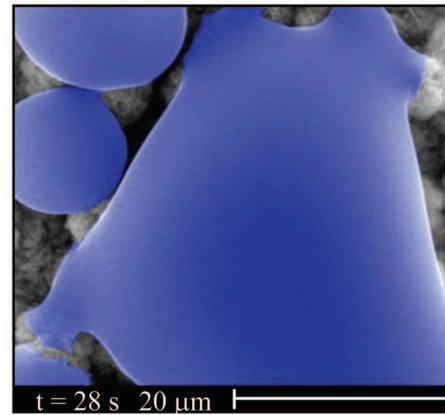
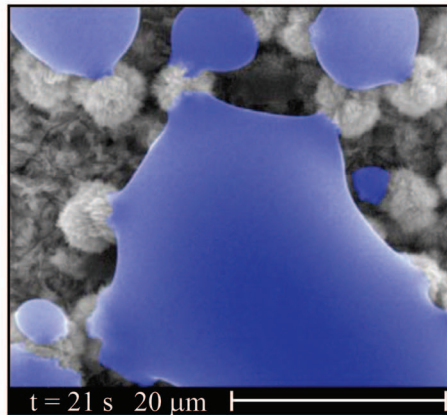
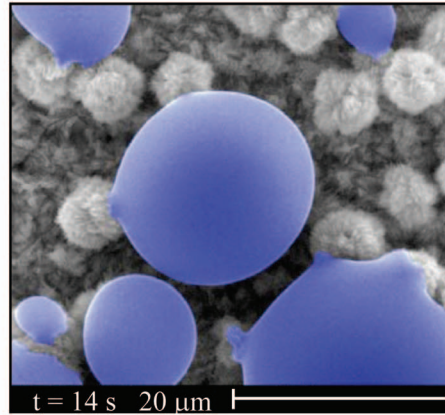
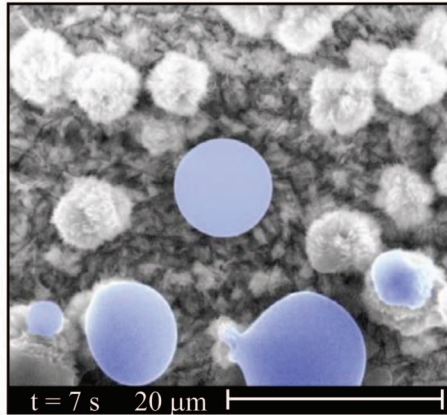


SEM image of a CuO nanostructured surface formed by alkali assisted surface oxidation.



## ESEM Imaging of Condensation on a Nanostructured Superhydrophobic Surface

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Environmental SEM images of water vapor at 5 Torr condensing on a CuO superhydrophobic surface held at 0°C. The drop growth, pinning on the surface, and coalescence is depicted in this series of images. The flower-like, CuO nanostructures, consisting of a ~3 μm diameter bud and ~200 nm thick petals, are formed by immersing copper into a solution of 2.5 M NaOH and 0.1 M (NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub>. The self assembled nanostructures are then functionalized with a fluorinated polymer. The result is a superhydrophobic surface (a surface in which the contact angle is greater than 150°).

Condensation on a superhydrophobic surface may lead to a permanent increase in the heat transfer coefficient. By using an environmental SEM and a Peltier stage, high resolution images of water vapor condensing on these surfaces is visualized. Due to drop pinning on the structures, the drops are not spherical after coalescence. As a result, the surface tends to be wetted by the condensate, bringing in to question whether superhydrophobic surfaces are still superhydrophobic under ESEM operating conditions.