

Transparent superhydrophobic glass coatings for electronic devices

September 27 2016, by Sara Shoemaker



An ORNL-developed thin glass film with superhydrophobic properties repels water that carries away dust and dirt, reduces light reflection and resists fingerprints and smudges. Credit: Oak Ridge National Laboratory

Samsung Electronics has exclusively licensed optically clear superhydrophobic film technology from the Department of Energy's Oak Ridge National Laboratory to improve the performance of glass displays on smartphones, tablets and other electronic devices.

ORNL's development of a transparent coating that repels water that carries away dust and dirt, reduces light reflection and resists fingerprints and smudges resulted from approximately three years of superhydrophobic research on glass-based coatings.

"The thin nanostructured layer of porous glass film enables these combined properties, making it suitable for commercial applications," said ORNL's Tolga Aytug, co-inventor of the technology.

To be superhydrophobic, a surface must achieve a water droplet contact angle exceeding 150 degrees. ORNL's coating has a contact angle of between 155 and 165 degrees, so water literally bounces off, taking away dust particles.

The ORNL research team developed the superhydrophobic technology by depositing a thin glass film on a glass surface and heating the coated glass to transform the surface into two material compositions. A selective etching process produces a porous three-dimensional network of high-silica content glass that resembles microscopic coral and enables water-repellent and antireflective properties.

Beyond electronics, the technology holds significant potential for applications in [solar panels](#), lenses, detectors, windows and many other products. The fields of solar panels and architectural windows are still available for licensing.

Aytug led the technology's development in collaboration with ORNL co-inventors Parans Paranthaman, Daniela Bogorin, David Christen, Brian D'Urso and John Simpson and was recognized with an R&D 100 Award in 2015. The work was supported by ORNL's Laboratory Directed Research and Development Program and Technology Innovation Program.



ORNL's Tolga Aytug uses thermal processing and etching capabilities to produce a transparent superhydrophobic coating technology licensed by Samsung Electronics to improve the performance of glass displays on electronic devices. Credit: Oak Ridge National Laboratory

Provided by Oak Ridge National Laboratory

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