Sandia wins three R&D 100 awards

Subject areas diverge widely

ALBUQUERQUE, N.M. —Every 12 months, teams of experts selected by Chicago-based *R&D Magazine* name their choices of the year's 100 most outstanding advances in applied technologies.

Sandia National Laboratories researchers — competing in an international pool that includes universities, private corporations, and government labs — this year were selected for three of those 100 awards. They were for the Xyce™ Parallel Electronic Simulator 4.0.2, submitted by Eric Keiter; the Silicon Micromachined Dimensional Calibration Artifact for Mesoscale Measurement Machines, submitted by Hy Tran; and the Superhydrophobic Coating, submitted by Jeff Brinker.

"This is yet the latest example of how the Department of Energy and our national laboratories are continuing to demonstrate world-class leadership in innovation, as we enhance our energy security, national security, and economic competiveness," Energy Secretary Samuel Bodman said. "On behalf of the Department, I would like to congratulate all of our employees who have earned R&D 100 awards and in particular this year's winners."

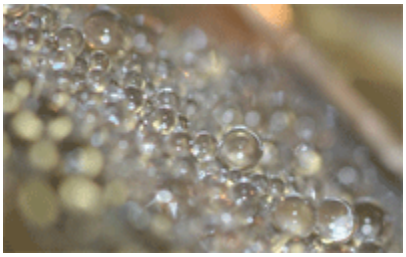
Sandia is a National Nuclear Security Administration laboratory.

A coating that really, really doesn't like water

A transparent coating that isn't just impermeable to water but actually makes it bounce off a surface has a number of potentially interesting applications. It could prevent corrosion, protect electronics and antiquities, or provide a new, more efficient surface to collect pure water. Modeled from Nature — the lotus leaf's micro-craggy roughness and the hydrophobic regions of the Namib Sternocara Desert beetle — the Brinker group used sol-gel chemistry to make a patent-applied-for, simple-to-prepare coating solution that, upon simple drying, develops a nanoscopically rough silicon dioxide surface decorated with hydrophobic (water-hating) ligands. The coating can be applied by any standard method — including spin-coating, dip-coating, aerosol spraying, and ink-jet printing — to any surface regardless of composition, size, and shape. An additional benefit is its nearly perfect optical clarity, important for applications like self-cleaning, non-fogging displays, avoiding ice formation on optical elements, and protecting — in a transparent fashion — culturally important statuary from acid-rain corrosion. Importantly the contact angle of the water droplet can be patterned with light to vary from a sphere to a pancake and to control whether and where a drop may roll. Competing hydrophobic products on the whole require very complex processing, are often

opaque, and are generally substrate specific. Furthermore they do not provide optically defined spatial control of the coating's love-hate relationship with water.

Groups led by Brinker have won three R&D 100 awards.



Water harvested on a surface patterned to mimic the back of the Namib Sternocara Desert beetle.