

Toward improved non-stick surfaces at the flip of a switch

Researchers in New Jersey report development of a new type of non-stick material whose ability to shed liquids like water from a duck's back can be turned on or off simply by flipping an electrical switch.

The material, called “nanonails,” offers a wide-range of potential applications including contamination-resistant and self-cleaning surfaces, reduced-drag ships, and advanced electrical batteries, they say. Their study is scheduled for the Jan. 1 issue of ACS' *Langmuir*.

For years, researchers sought to develop surfaces that repel virtually any liquid. They've created non-stick surfaces that repel water and certain other liquids, but have had little success with repelling common organic liquids such as oils, solvents and detergents.

Tom N. Krupenkin and colleagues report that their “nanonails” have all-purpose repellency properties. The nails actually are submicroscopic silicon structures shaped like carpenter's nails that dramatically enhance a surface's repellency. However, the surface becomes highly wettable when electricity is applied, allowing liquid to be sucked between the nails.

In laboratory demonstrations, the researchers showed that their electronic non-stick surface works effectively using virtually any liquid.

“Nanonails” also show promise for enhancing chemical microreactions, decreasing flow resistance, and facilitating liquid movement for medical diagnostic applications such as lab-on-a-chip technology, they say.

Source: ACS

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