US scientists develop coating to capture airborne droplets

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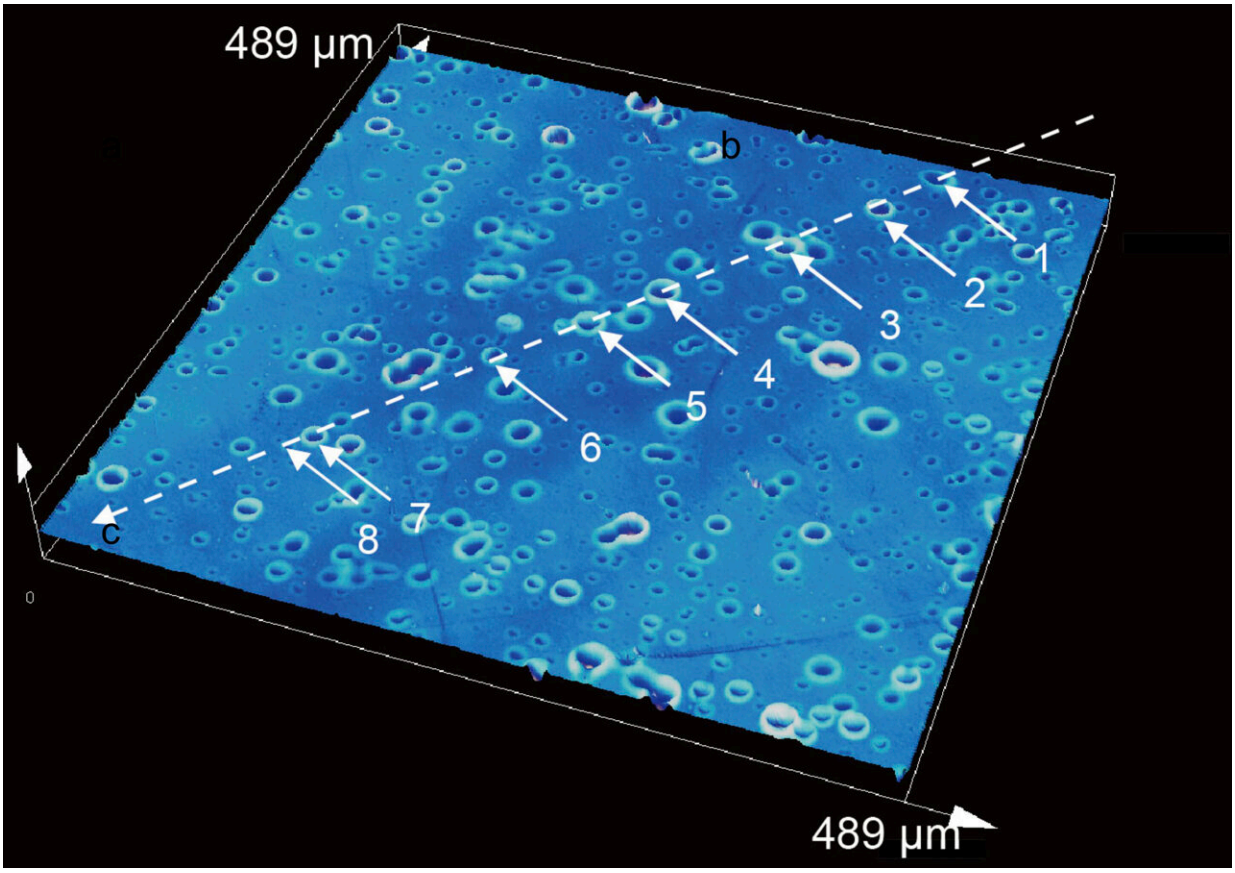

A 3D image (taken with laser confocal microscopy) shows crater-like features generated by the captured droplets. Credit: Northwestern University

US scientists said Wednesday they had developed a sticky wall coating that repurposes ingredients used in hair conditioners to trap aerosolized

droplets, and hope it will become another tool in the fight against COVID and other airborne diseases.

The substance can be applied to surfaces such as plexiglass dividers to capture respiratory droplets, rather than allowing them to bounce off and remain in circulation.

"Droplets collide with indoor surfaces all the time," said Northwestern University engineering professor Jiaxing Huang, senior author of a paper on the subject that was published Wednesday in the journal *Chem*.

"Right now, plexiglass dividers are deviating devices; they deflect droplets. If a surface could actually trap droplets, then every single droplet effectively removed from indoor air would be a successful elimination of a potential source of transmission."

COVID-19 is primarily transmitted through respiratory fluids—including large droplets and fine aerosols—when an infected person speaks, sneezes or breathes.

The main way to remove these from the air is to open windows and to use high-filtration devices that capture fine particles and change out the air at high rates.

To build extra protection on top of that, Huang and colleagues came up with the idea of using PAAm-DDA, a polymer which is commonly used in hair products and other cosmetics to lock in moisture, as the main ingredient of their coating.

They applied the substance with a brush to a variety of surfaces and performed tests to compare coated and uncoated surfaces.

A coated plexiglass barrier captured nearly all aerosolized microdroplets,

and 80 percent of large droplets, compared to a barrier that was uncoated.

The coating did not become visibly soiled after use, and the scientists said it would not require cleaning more often than non-coated barriers. Once saturated, the substance should be wiped down with water and reapplied.

Since it can be applied to a variety of surfaces, including concrete, metal and fabric, Huang said it could be used on low-touch areas such as walls or curtains to turn those into "functional devices" that would help capture aerosolized particles.

A vial of the new, transparent polymer solution, which is sufficiently viscous for blade coating. Credit: Northwestern University

Many more research steps are required to confirm the coating's utility before it can be authorized for use.

"We understood that the current pandemic may end before this concept is implemented," Huang said. "It may or may not be used now. But next time, when an outbreak like this happens, I think we will be better equipped."

More information: *Chem*, Huang et al.: "Droplet-capturing Coatings on Environmental Surfaces Based on Cosmetic Ingredients" DOI: 10.1016/j.chempr.2021.05.017 , www.cell.com/chem/fulltext/S2451-9294(21)00266-7