

New, more versatile version of Geckskin: Gecko-like adhesives now useful for real world surfaces

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Credit: University of Massachusetts Amherst

(Phys.org) —The ability to stick objects to a wide range of surfaces such as drywall, wood, metal and glass with a single adhesive has been the elusive goal of many research teams across the world, but now a team of University of Massachusetts Amherst inventors describe a new, more versatile version of their invention, Geckskin, that can adhere strongly to

a wider range of surfaces, yet releases easily, like a gecko's feet.

"Imagine sticking your tablet on a wall to watch your favorite movie and then moving it to a new location when you want, without the need for pesky holes in your painted wall," says polymer science and engineering professor Al Crosby. Geckskin is a 'gecko-like,' reusable adhesive device that they had previously demonstrated can hold heavy loads on smooth surfaces such as glass.

Crosby and polymer science researcher Dan King, with other UMass Amherst researchers including biology professor Duncan Irschick, report in the current issue of *Advanced Materials* how they have expanded their design theory to allow Geckskin to adhere powerfully to a wider variety of surfaces found in most homes such as drywall, and wood.

Unlike other gecko-like materials, the UMass Amherst invention does not rely on mimicking the tiny, nanoscopic hairs found on gecko feet, but rather builds on 'draping adhesion,' which derives from the gecko's integrated anatomical skin-tendon-bone system. As King explains, "The key to making a strong adhesive connection is to conform to a [surface](#) while still maximizing stiffness."

In Geckskin, the researchers created this ability by combining soft elastomers and ultra-stiff fabrics such as glass or carbon fiber fabrics. By "tuning" the relative stiffness of these materials, they can optimize Geckskin for a range of applications, the inventors say.

To substantiate their claims of Geckskin's properties, the UMass Amherst team compared three versions to the abilities of a living Tokay gecko on several surfaces, as described in their journal article this month. As predicted by their theory, one Geckskin version matches and even exceeds the gecko's performance on all tested surfaces.

Irschick points out, "The gecko's ability to stick to a variety of surfaces is critical for its survival, but it's equally important to be able to release and re-stick whenever it wants. Geckskin displays the same ability on different commonly used surfaces, opening up great possibilities for new technologies in the home, office or outdoors."

Crosby notes, "It's been a lot of fun thinking about all of the different things you ever would want to hang somewhere, and then doing it. Geckskin changes the way you think."

More information: Paper: [onlinelibrary.wiley.com/doi/10 ...
a.201306259/abstract](https://onlinelibrary.wiley.com/doi/10.1002/advs.201306259/abstract)

Provided by University of Massachusetts Amherst

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