

Smart Reusable Adhesive Brings Us One Step Closer To Spider-Man

Scientists from NTU Singapore have developed a smart, reusable adhesive more than ten times stronger than a gecko's feet adhesion, pointing the way for development of reusable superglue and grippers capable of holding heavy weights across rough and smooth surfaces.

The NTU research team found a way to maximise the adhesion of the smart adhesives by using shape-memory polymers and designing them in the shape of hair-like fibrils. The material can stick onto surfaces and detach easily, leaving no trace, simply by using heat from a hair dryer.

Upon heating, the material turns into a soft rubber-like state that can conform and lock onto microscopic nooks and crevices. As it cools, it becomes glassy, creating extra-strong adhesive bonds due to a shape-locking effect.

By arranging a collection of such fibrils, the researchers were able to increase the weight the adhesive can hold. The smart adhesive can support the weight of a human person, opening new possibilities for robotic grippers that allow humans to scale walls effortlessly, or climbing robots that can cling onto ceilings for survey or repair applications.

Source: Nanyang Technological University
