



Photo Preeti Sharma/Biointerphases

Sticking to mushrooms

Wageningen scientists have developed a material that sticks better than Velcro and leaves no trace.

Everyone is familiar with Velcro and the way its two strips of fabric stick to each other mechanically. A major drawback of the material is that one of the surfaces can get damaged when they are pulled apart. Researchers from Wageningen (Physical Chemistry and Soft Matter and BioNanoTechnology) and Groningen have found a solution to this.

The researchers designed a surface made of silicone rubber that is densely covered in tiny mushroom-shaped pillars. The substance adheres perfectly to rough surfaces such as textiles. Adhesion occurs because the tiny mushrooms hook onto the mesh of the textile. The material is flexible, which prevents damage when it is removed. The production method is new as well. The mould used to produce the mushrooms was 3D-printed, creating a negative as the basis for a positive. A patent for this method is pending.

The closer the mushrooms are packed together, the stronger the adhesive effect, researcher Joshua Dijkman explains. The adhesive strength of each individual mushroom goes down, however. 'This is due to the fact that mushrooms communicate through the surface they are sticking to.' When you pull one mushroom out, you tug at the next one too through the flexible surface.

The flexibility of the material prevents damage when removing it

The forces involved can be measured using a newly developed measuring method. The phenomenon of 'communication' creates scope for experimentation, says Dijkman: 'To change the degree of adhesion, you can alter the number of mushrooms or the hardness of the material.' The material works well on rough surfaces. For smoother surfaces, experiments are being conducted with tiny suction cups instead of mushrooms. RK

