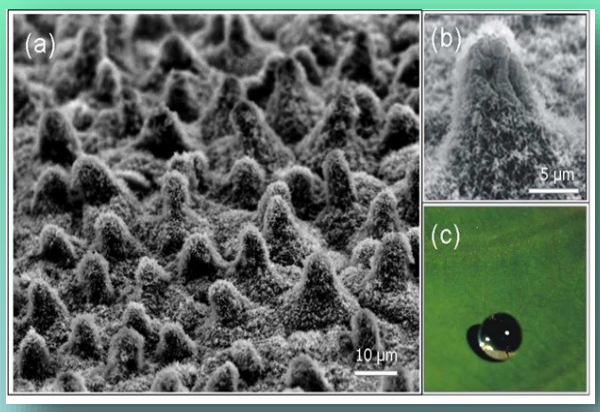
BIOMIMICRY:
REAL WORLD APPLICATIONS

Lotus Effect:

The leaves of the lotus flower exhibit extremely water-repellent properties due to micro and nano-structures on the leaf surface. These structures allow the plant to have a magnificent self-cleaning function. How does the lotus leaf surface enable this? The behaviour of water on the leaf surface is key. This behaviour is dependent upon the balance of water's inherent attraction to itself and its attraction to air and solid surfaces.

Water tends to stick most readily to smooth surfaces, as the area of contact between the water and the surface is large. Rough surfaces contain tiny pockets of air, to which water is only weakly attracted. These pockets of air act as barriers, preventing water from interacting with the solid surface below. As a result, the water's attraction to itself overcomes its attraction to the leaf surface of the lotus flower, and it forms tiny droplets that roll off the leaf instead of spreading out and making the leaf wet.



So how does this lead to self-cleaning? The water droplets are prevented from interacting with the solid leaf surface, but that doesn't stop them from interacting with other nearby solids, like dirt. Water droplets pick up dirt on the lotus leaf because the attraction of the dirt to the water droplet is greater than the attraction of the dirt to the leaf. Therefore the water droplet picks up the dirt as it rolls off the leaf.

Uses:

This concept has been extrapolated and applied to sealing windshields, water-proofing phones, and protecting fabrics, wood, and other surfaces from dirt, dust, or car exhaust particle residue. The product by Nano-dyze exploits the same concept of the lotus leaf's super-hydrophobic nanostructures for its application in self-cleaning