

Health and safety

Avoid rubbing too much the textile as it will damage its properties



You will need

- A piece of hydrophobic textile
- A Pasteur pipette
- Water
- A cabbage leaf

What you can do

- Take some water in your Pasteur pipette and place it, drop by drop, onto the surface of your fabric.

What happens to the water?

What happens to the fabric - is it wet or dry?

- Now sprinkle some chalk dust on the surface (don't rub it in as it will spoil the fabric) and drop some water over the surface

What happens to the dirt on the surface?

- Take the cabbage leaf and drop some water onto it with the Pasteur pipette

Is it similar to the fabric?

What do you think makes the fabric act like this?

Can you think of applications for this fabric?

What's happening?

Surfaces that can repel water are known as '**hydrophobic**' (from the Latin words 'hydro' meaning water and 'phobic' meaning hating). The 'lotus effect' refers to a particular type of very high water repellency found in nature. It is named after the lotus plant, whose leaves are very hydrophobic. This textile mimics the lotus effect.

When rain falls on the surface of the lotus plant, tiny nanostructures on the leaves keep the water droplets in a spherical form. This means the water droplets roll easily off the surface, picking up dirt particles as they go. This keeps the surface of the leaves clean and dry.



If you look carefully at the duck in the photo you can see that the water on its back is in the form of droplets. If the water was not like this it would get through the duck's feathers and the duck would get wet and cold. The duck's feathers are also superhydrophobic in part because of the structure of their wings at the nanoscale.



What does it mean?

Hydrophobic surface: A surface that wants to stay dry and will repel water without getting wet itself. More generally, a hydrophobic compound is a substance that can't be mixed or dissolved in water because it is not able to bond to the water molecules. For example, all oils are hydrophobic liquids, which is why oil spills float on top of the sea rather than mixing with it.

To find out more

- <http://nanotechweb.org/cws/article/tech/16392>
- <http://www.lotus-effekt.de/en/faq/index.php>
- <http://live.psu.edu/story/34610>
- http://en.wikipedia.org/wiki/Lotus_effect

