

# New cotton fabric stays waterproof through 250 washes

October 28 2010, by Lin Edwards

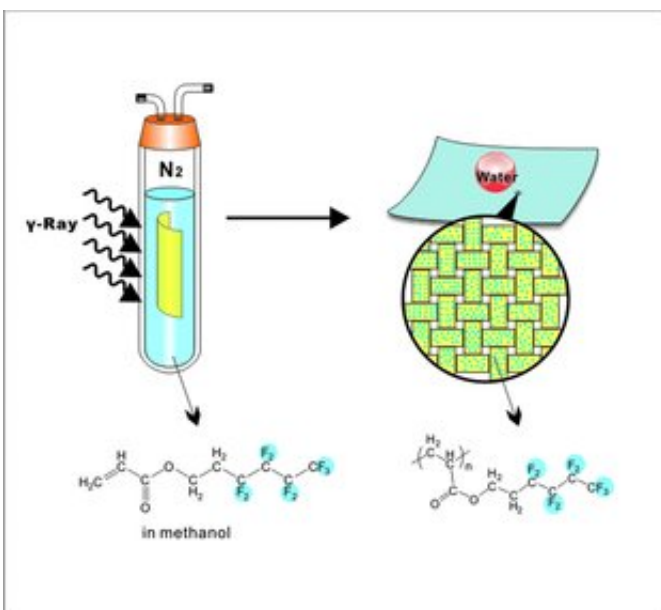


Image credit: *Advanced Materials*, DOI:10.1002/adma.201002614

(PhysOrg.com) -- Scientists in Shanghai in China, have developed a waterproof cotton fabric that remains waterproof after going through a domestic wash at least 250 times.

Most waterproofed fabrics lose their super-hydrophobic properties after only one or two washes, and they become uncomfortable to wear because they do not allow air flow through the material. In contrast, the new fabric, which according to the researchers looks almost identical to

ordinary cotton fabric, is completely impermeable and breathable, and retains its properties even after being laundered many times.

The new fabric was made by grafting a commercially available fluorinated acrylate monomer (1H,1H,2H,2H-nonafluorohexyl-1-acrylate) onto bundles of cotton fibers which were irradiated with [gamma rays](#) to induce [polymerization](#). In this process the cotton forms covalent bonds with the [polymer](#), and it is not simply coated. The polymer prevents water adhering to the cotton surface and the water instead forms [droplets](#) that roll off the fabric, taking any dust or surface dirt with them.

Researcher Jingye Li, from the Shanghai Institute of Applied Physics at the Chinese Academy of Sciences, said grafting the polymer onto the bundles of fibers meant the small holes between the cotton bundles are retained in the fabric. This enables the material to remain breathable and comfortable to wear even after multiple washings. He also said its super-hydrophobic nature made the fabric feel smoother than normal cotton.

Li and colleagues tested the fabric by subjecting it to 50 accelerated launderings in a domestic [washing machine](#) with different detergents, and with 50 stainless steel balls to simulate the repeated washing. The tests showed the fabric retained its super-hydrophobic properties even after the equivalent of 250 domestic or commercial washes at 40°C.

The paper is published in the journal *Advanced Materials*.

**More information:** Laundering Durability of Superhydrophobic Cotton Fabric, Bo Deng et al., *Advanced Materials*, [DOI:10.1002/adma.201002614](https://doi.org/10.1002/adma.201002614)

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