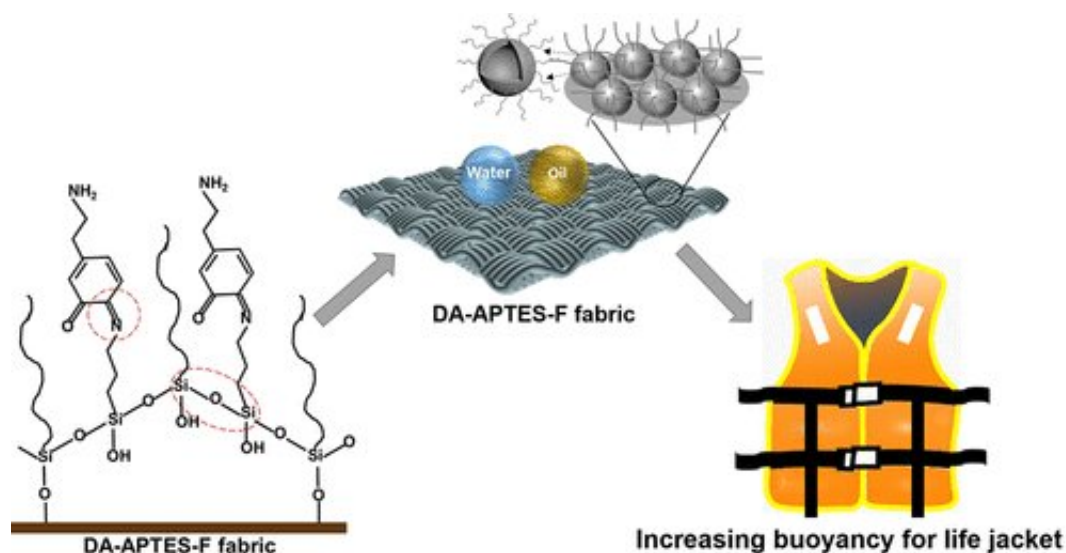


Floating into summer with more buoyant, liquid-proof life jackets and swimsuits

July 14 2021



Credit: *ACS Applied Materials & Interfaces* (2021). DOI: 10.1021/acsami.1c08844

Summertime is here, and that often means long, lazy days at the beach, water skiing and swimming. Life jackets and swimsuits are essential gear for these activities, but if not dried thoroughly, they can develop a gross, musty smell. Now, researchers reporting in *ACS Applied Materials & Interfaces* have developed a one-step method to create a buoyant cotton fabric for these applications that is also oil- and water-repellent.

Waterproof and oil-proof fabrics are in high demand for recreational

water activities because of their low drag and self-cleaning properties. And while cotton is a popular fabric, it's hydrophilic, so most liquids and dirt can easily mess it up. To improve cotton's impermeability, previous researchers developed superamphiphobic coatings that were extremely water- and oil-repellent. But because they required multiple time-consuming steps to apply, these coatings were impractical for large-scale manufacturing. Others incorporated nanoparticles into their formulas, but there are concerns about these particles sloughing off and potentially harming the environment. Xiao Gong and Xinting Han wanted to develop a simple way to make a coating for cotton fabric so it would have superb liquid-repulsion properties and hold up in many challenging circumstances.

The researchers optimized a one-step process for a liquid-proof coating by mixing dopamine hydrochloride, 3-aminopropyltriethoxysilane and 1H,1H,2H,2H-perfluorodecyltriethoxysilane with a piece of cotton fabric for 24 hours. The three-part solution developed into a uniform, dark brown coating on the fabric. In tests, the treated cotton was impervious to many common liquids. The new solution also coated inner cotton fibers, making them liquid proof, too. In other tests, only [strong acid](#) and repeated washings reduced the material's water and oil resistance, respectively. Treated fabric soiled with fine sand was easy to clean with water, whereas [water](#) only wetted the control version.

Finally, the material stayed afloat with up to 35 times its weight on it because of nanoscale air pockets that formed where the [coating](#) attached to the fabric, the researchers explain. They say their durable [cotton fabric](#) has great potential for applications where drag reduction and increased buoyancy are important, including swimsuits and [life jackets](#).

More information: Xinting Han et al, In Situ, One-Pot Method to Prepare Robust Superamphiphobic Cotton Fabrics for High Buoyancy and Good Antifouling, *ACS Applied Materials & Interfaces* (2021). [DOI:](#)

[10.1021/acsami.1c08844](https://doi.org/10.1021/acsami.1c08844)

Provided by American Chemical Society

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