E- textiles control home appliances with the swipe of a finger

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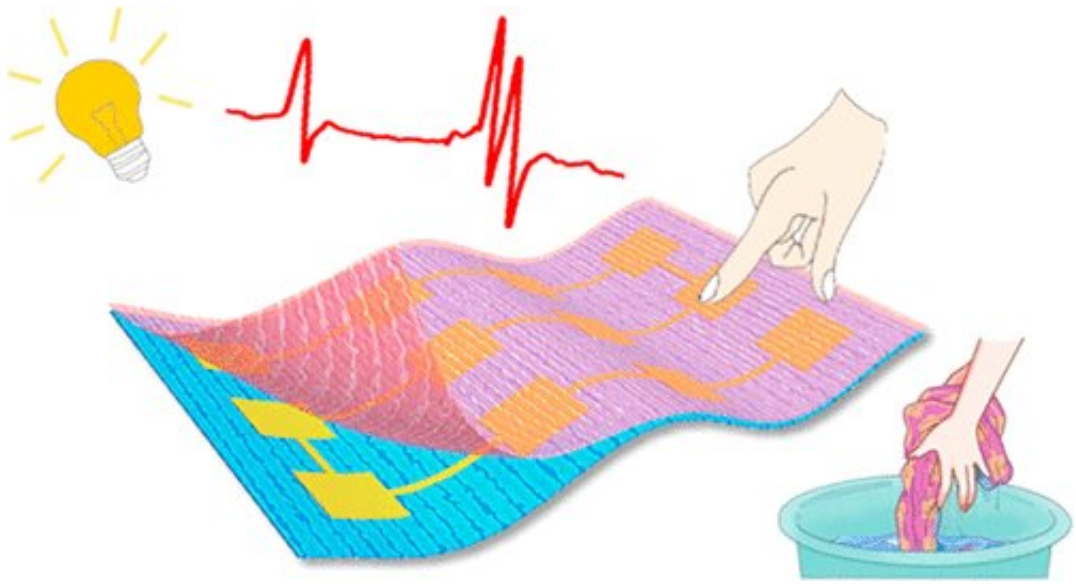

Credit: American Chemical Society

Electronic textiles could allow a person to control household appliances or computers from a distance simply by touching a wristband or other item of clothing—something that could be particularly helpful for those with limited mobility. Now researchers, reporting in *ACS Nano*, have developed a new type of e-textile that is self-powered, highly sensitive and washable.

E-textiles are not new, but most existing versions have poor air permeability, can't be laundered or are too costly or complex to mass-

produce. Jiaona Wang, Hengyu Guo, Congju Li and coworkers wanted to develop an E-textile that overcomes all of these limitations and is highly sensitive to human touch.

The researchers made a self-powered triboelectric nanogenerator by depositing an electrode array of conductive carbon nanotubes on nylon fabric. To make the E-textile washable, they incorporated polyurethane into the carbon nanotube ink, which made the nanotubes firmly adhere to the fabric. They covered the array with a piece of silk and fashioned the textile into a wristband. When swiped with a finger in different patterns, the E-textile generated electrical signals that were coupled to computers to control programs, or to household objects to turn on lights, a fan or a microwave from across the room. The E-textile is breathable for human skin, washable and inexpensive to produce on a large scale, the researchers say.

More information: Ran Cao et al. Screen-Printed Washable Electronic Textiles as Self-Powered Touch/Gesture Tribo-Sensors for Intelligent Human–Machine Interaction, *ACS Nano* (2018). DOI: 10.1021/acsnano.8b02477

Abstract
Multifunctional electronic textiles (E-textiles) with embedded electric circuits hold great application prospects for future wearable electronics. However, most E-textiles still have critical challenges, including air permeability, satisfactory washability, and mass fabrication. In this work, we fabricate a washable E-textile that addresses all of the concerns and shows its application as a self-powered triboelectric gesture textile for intelligent human–machine interfacing. Utilizing conductive carbon nanotubes (CNTs) and screen-printing technology, this kind of E-textile embraces high conductivity (0.2 kΩ/sq), high air permeability (88.2 mm/s), and can be manufactured on common fabric at large scales. Due

to the advantage of the interaction between the CNTs and the fabrics, the electrode shows excellent stability under harsh mechanical deformation and even after being washed. Moreover, based on a single-electrode mode triboelectric nanogenerator and electrode pattern design, our E-textile exhibits highly sensitive touch/gesture sensing performance and has potential applications for human–machine interfacing.

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