

Solar-Powered Battery Woven into Fabric Overcomes Hurdle for 'Wearable Electronics'

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Though some people already seem inseparable from their smartphones, even more convenient, wearable, solar-powered electronics could be on the way soon, woven into clothing fibers or incorporated into watchbands. This novel battery development, which could usher in a new era of "wearable electronics," is the topic of a paper in the ACS journal Nano Letters.

Taek-Soo Kim, Jung-Yong Lee, Jang Wook Choi and colleagues explain that electronic textiles have the potential to integrate smartphone functions into clothes, eyeglasses, watches and materials worn on the skin. Possibilities range from the practical — for example, allowing athletes to monitor vital signs — to the aesthetic, such as lighting up patterns on clothing.

The bottleneck slowing progress toward development of a wider range of flexible e-fabrics and materials is the battery technology required to power them. Current wearable electronics, such as smartwatches and Google Glass, still require a charger with a cord, and already-developed textile batteries are costly and impractical.

To unlink smart technology from the wall socket, the team had to rethink what materials are best suited for use in a flexible, rechargeable battery that's also inexpensive.

They tested unconventional materials and found that they could coat polyester yarn with nickel and then carbon, and use polyurethane as a binder and separator to produce a flexible battery that kept working, even after being folded and unfolded many times. They also integrated lightweight solar cells to recharge the battery without disassembling it from clothing or requiring the wearer to plug in.

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