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A Sewing-enabled Stitch-and-Transfer Method for Robust, Ultra-stretchable, Conductive Interconnects

A novel, low-cost sew and transfer method enables the rapid fabrication of extremely stretchable and robust electrical interconnects for next-generation flexible electronics, including wearable and implantable devices.

Fabricating highly stretchable, robust electrical interconnects at low-cost remains an unmet challenge in stretchable electronics. Previously reported, stretchable interconnects require complicated fabrication processes with resulting devices exhibiting limited stretchability, poor reliability, and large gauge factors.

Purdue University researchers have developed a novel, sew and transfer method for rapid fabrication of low-cost, highly stretchable interconnects. Using a commercial sewing machine and double-thread stitch, with one of the threads being water-soluble polyvinyl alcohol (PVA), thin zigzag pattern metallic wires are sewn into a polymeric film and are subsequently transferred onto a stretchable elastomeric substrate by dissolving PVA in warm water. The resulting structures exhibit extreme stretchability and robustness.

Advantages:

-Low-cost method to fabricate stretchable electronics

-Extreme stretchability and robustness

-No change in resistance with strain

Potential Applications:

-Wearable electronics

-Skin mounted electronics

-Implantable medical systems

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