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Wearable textile-based energy harvester designed for human motion.[1] REBECA GURROLA[2], St. Mary's University, JANNA EAVES[3], CARY PINT[4], Vanderbilt University — While there are many different methods of generating sustainable energy, small quantities of energy otherwise wasted in the pursuit of everyday activities are often overlooked. Recently, electrochemical energy harvesters joined the ranks of piezoelectric and triboelectric harvesters to convert mechanical energy into electrical energy. Here, we use materials with mechanochemical response to seamlessly integrate motion harvesting into textiles for wearable applications. This study presents a novel class of safe and non-toxic "smart" energy harvesters which can be activated via sweat, simulated here by a solution of NaCl. The harvester comprised of a sodium tin alloy on copper fabric exploits ambient motion at frequencies of 0.1 Hz. In bend tests, the harvester generates a peak power of ˜36.4 μW/cm^2 and energy of ˜131.1μJ/cm^2 with each bend. Additionally, it is sensitive to changes in salt concentration, suggesting applications in hydration-monitoring. These results emphasize the exciting possibilities for a new class of wearable harvesters.

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