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Piezolectric Charging for Smart Fabric Applications ROSS HACKWORTH, JULIE MORIERA, RAMAKRISHNA KOTHA, ROBERT MAXWELL, ARTURO AYON — We report on the feasibility of employing flexible poly(vinylidene fluoride), or pvdf, piezoelectric membranes to be used to generate an electrical charge for powering portable electronics. By converting a person's naturally expended mechanical energy into useful electrical energy, the batteries currently in use in portable electronic devices may be minimized, as well as made efficiently green. Our current research includes an innovative design and fabrication method that integrates a flexible piezoelectric onto clothing similar to previous works, our approach is to build the devices directly onto the fabric allowing for low temperature processes (less than 200 $^{\circ}$C). The device will consist of a bottom electrode/wearable fabric, a piezoelectric layer and a top electrode to complete the power generating smart fabric. A membrane 6 μm thick of PVDF is combined with 100 nm sputtered gold electrodes on the outer surfaces to allow for electrode contacts. The contacts are connected to a data collection device, a rechargeable battery, or a capacitor as required for energy storage and evaluation. The electrodes are connected to a DAC system to determine the voltage output. The membrane generates a voltage of approximately 200 mV, with a background noise level of 40 mV.

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