

Materials and Approaches for On-body Energy Harvesting

S. Roundy and S. Trolier-McKinstry

The human body is a challenging platform for energy harvesting. For thermoelectrics, the small temperature differences between the skin and air necessitate materials with low thermal conductivities in order to maintain useful output powers. For kinetic harvesting, human motion is not strongly tonal, the frequencies are very low, and the accelerations are modest. Kinetic harvesting can be split into two categories-inertial, in which human motion excites an inertial mass-the motion of which is transduced to electricity, and clothing integrated, in which the harvesting material is integrated with a garment or other flexible wearable system. In the first case, key issues are the electromechanical dynamics of the system and materials with improved electromechanical transduction figures of merit. In the second case, materials that provide flexibility, stretchability, and comfort are of primary importance.