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Harvesting triboelectricity from the human body using non-electrode triboelectric nanogenerators

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Abstract

Triboelectrification has been known and discussed since antiquity. Triboelectrification occurs in the human body due to friction between human skin and other materials such as clothing. However, charges on the body have not been harvested to power small electronics. Here, we report for the first time that the electricity generated on the human body due to triboelectrification can be measured and harvested using human body-based non-electrode triboelectric nanogenerators (H-TENGs). The H-TENGs can have an output of up to 3.3 W/m² and can spontaneously harvest energy from several people. The functions of the human body in the H-TENGs are analyzed and experimentally proven to be those of a triboelectric material, conductor and capacitor. Our results demonstrate that the triboelectricity generated on a human body can be harvested using H-TENGs and provide scientific insights into body functions that will promote further studies of TENGs.

Keywords: Human body; non-electrode TENG; Mechanisms; Charges

Background

Triboelectrification [1] or contact electrification [2] is a common phenomenon, but its mechanisms are still under debate [3,4]. The phenomenon also occurs on the surface of the human body [5,6]. The friction between skin and textiles generates charges on the surface of the skin. As we touch a metal object, we may experience a small spark as the charges flow

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