TRIBOELECTRIC SENSOR AND CONTROL SYSTEM

TECHNICAL FIELD

The present disclosure relates broadly to a triboelectric sensor, and to a control system that includes one or more triboelectric sensors.

BACKGROUND

Wearable sensors have recently become of great interest for various applications, such as tactile sensing and pressure sensing in the context of healthcare and gaming control.

A limitation of many such sensors is that they require an external power source. Accordingly, recent efforts have been directed to the development of a number of self-powered sensors based on triboelectric nanogenerators (TENGs). A TENG is an energy harvesting device that converts external mechanical energy into electricity by a combination of the triboelectric effect and electrostatic induction. In a TENG, a potential is created by the triboelectric effect due to the charge transfer between two materials that exhibit opposite tribo-polarity.

TENGs can function as active sensors for detecting pressure change without the use of an external power source, and can therefore potentially be used as self-powered tactile sensors. A further advantage of TENGs is that it may be possible to avoid the use of complex electric circuits in devices that incorporate them.

Tactile sensor arrays have also been investigated for various applications. For example, it has previously been proposed by X. Wang *et al. (Adv. Mat.* 2018, 30, 1706738) to fabricate a flexible and stretchable 8 x 8 triboelectric sensor array using PDMS and Ag nanofiber electrodes. The triboelectric tactile sensor array demonstrated by X. Wang *et al.* can be used to extract and detect trajectory information from the outputs of the 64 electrodes associated with the 8 x 8 pixels of the array when a user draws a trace across the array. However, for tactile sensors, increased resolution and more targets for location means an