Electronics/Electrical

Biodegradable Guar Gum TENG for Energy Harvesting
Technology Domain: Electronics
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Technology Summary: This invention introduces a novel Flexible and Biodegradable Guar Gum Polymer Film Based TENG (G-TENG), offering an eco-friendly solution for energy harvesting and self-powered sensing. The key technical solution leverages triboelectric nanogenerator principles, utilizing a biodegradable guar gum thin film as the positive triboelectric layer and a biocompatible ecoflex film as the negative layer. A key inventive feature is the use of a graphite-guar gum composite (Gr@GG) as the conductive electrode, enabling efficient charge transfer via contact-separation mode. Results demonstrate impressive electrical performance, generating up to 110 volts peak-to-peak and 7.5 µA short-circuit current, capable of powering small electronics like LEDs and LCDs. Furthermore, its hygroscopic nature allows it to function as a self-powered humidity sensor, with voltage output correlating directly to humidity changes (e.g., 6V at 98% RH to 18V at 44% RH). Its primary use is in sustainable energy generation from biomechanical motion and as a highly responsive, self-powered humidity sensor, suitable for wearable devices and environmental monitoring.