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Смотреть больше

Ag Nanowire/CPDMS Dual Conductive Layer Dome-Based Flexible Pressure Sensor with High Sensitivity and a Wide Linear Range

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Краткое описание
Ключевые слова автора
Информация химической базы данных Reaxys
Включенные в указатель ключевые слова
Темы SciVal
Параметры
Сведения о финансировании

Краткое описание

Recent research achievements for flexible pressure sensors have promoted promising applications, such as human health detection and intelligent robotics. However, striking a balance between sensitivity and linear detection range is still a challenge. In this paper, a dual conductive layer dome (DCLD) structure, where a silver (Ag) nanowire layer is used as a highly conductive layer and the composite layer of carbon black nanoparticles and polydimethylsiloxane (CPDMS) serves as a low conductive layer, is fabricated with a scratch coating process followed by dip-coating and vacuum adsorption. Benefitting from the dual conductive layer design, the sensitivity of the DCLD sensor reaches 51.7 kPa^{-1}over an ultrawide pressure of 0.01-250 kPa, which is far better than the CPDMS single conductive layer dome (SCLD). The circuit models of DCLD and SCLD are proposed to disclose their working mechanism. The effects of carbon black nanoparticle ratio in CPDMS and the structural matching between the DCLD structure and electrode on the sensor's performance are explored. The long-cycle stability of DCLD sensors with different fabrication methods is also compared. Additionally, it has been demonstrated that the sensor is efficient in monitoring human motion, such as finger joint flexion, pulse pulses, and human breathing, showing potential in the field of human health monitoring.

Ключевые слова автора

Ag nanowires; CPDMS; dual conductive layer dome; human health detection

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