

웨어러블 센서용 다기능성 전자피부(Multifunctional Electronic Skins for Wearable Sensors)

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In this work, mimicking the structures and functions of human fingertip skin, we introduce highly-sensitive, multifunctional, and stretchable electronic skins. Inspired by the interlocked epidermal-dermal ridges in human skin, piezoresistive interlocked microdome arrays are employed for stress-direction-sensitive, stretchable electronic skins. We show that the interlocked microdome arrays possess highly direction-sensitive sensitive detection capability of various mechanical stimuli including normal, shear, stretching, bending, and twisting forces. We also demonstrate that the ferroelectric skins with fingerprint-like patterns and interlocked microstructures can detect and discriminate multiple spatio-temporal tactile stimuli including static and dynamic pressure, vibration, and temperature with high sensitivities. Finally, we show that the stretchable electronic skins are able to distinguish various mechanical stimuli applied in different directions, selectively monitor different intensities and directions of air flows and vibrations, and sensitively monitor human breathing flows and voice vibrations.