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(57) Abstract :

Flexible High-Sensitivity Capacitive Pressure Sensor Using PVDF–Silver–Kapton Architecture for Wearable Pulse Monitoring A flexible capacitive pressure sensor has been developed using a PVDF (polyvinylidene fluoride) dielectric layer sandwiched between silver electrodes deposited over Kapton substrates. A Nichrome interlayer is introduced to enhance electrode adhesion, and the PVDF layer is spin-coated from a DMF-based solution, resulting in a fibrous, porous morphology that increases deformability and capacitance sensitivity. The sensor exhibits a high sensitivity of 40.05 MPa⁻¹ across a 0–18 KPa pressure range, with excellent mechanical stability under bending up to 6° curvature and environmental resilience, functioning effectively below 0°C, above 100°C, and in aqueous conditions. Optical characterization reveals high reflectance and negligible absorption in the visible range, enabling stable performance under ambient lighting. Integrated into a wearable wrist-mounted device, the sensor demonstrated accurate beat-to-beat pulse detection, showing potential for continuous health monitoring. Figure 2

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