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Developing Wearable Biosensors from Raw Egg White

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Abstract

Natural polymers, such as proteins and polysaccharides, have gained significant attention as sustainable materials for biomedical applications, including biosensors. Hydrogels, known for their high-water content, porous structure, and soft texture resembling human skin, have become a promising choice for wearable biosensors. These compressible and wearable sensors are particularly valuable in human health monitoring and management. In this study, we introduce a novel and straightforward method for fabricating a compressible sensor using a physically crosslinked natural hydrogel derived from raw egg white (EW).

Our approach involves the fabrication of a double physically crosslinked EW hydrogel infused with conductive carbon nanotubes. This design allows the hydrogel to function as a pressure sensor, where applied pressure changes electrical resistance, enabling precise detection of force and movement. The developed wearable sensor can be connected to external electronic components through simple wiring. This cost-effective and scalable hydrogel-based sensor offers several advantages, including ease of fabrication and adaptability for various applications. It can be used for monitoring health signals, tracking human movements, and even integrating with smart devices for medical, emergency response, and computing applications. Additionally, this hydrogel sensor holds promise for any field requiring pressure or movement sensing, making it a versatile and valuable innovation.