

Humidity and Alcohol Sensors Based on Carbon/Agarose Gel Composite Micro-Fibers

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Electrically conducting composites based on carbon nanomaterials, such as graphene and carbon nanotube, are under consideration for numerous applications in energy storage, energy conversion devices, electronics, medical devices, and sensors. Here, I present a simple and general process for fabrication of carbon/agarose based composite microfibers. The key mechanism of the process is size reduction during dehydration of extruded larger diameter conducting filler-loaded agarose hydrogel filaments. It turns out that appropriate agarose/filler/water compositions are critical for reliable fiber extrusion. The resulting composite microfiber is robust and conducting enough for the fabrication of fiber-type microdevices. The chemical sensors detecting environmental humidity levels and liquid-phase alcohols based on the agarose composite microfiber exhibit good sensitivity and selectivity.