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Polymer Coatings Created by Reactive Vapor Deposition and Their Application in Wearable Electronics

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Efforts in using reactive vapor deposition to create functional polymer films on nontraditional substrates will be described. Vapor coating methods allow for rough and/or fragile substrates to be nondestructively coated with a variety of polymer films. To date, various off-the-shelf garments, commercial textiles, threads/yarns, plant leaves, and flower petals have been conformally coated with either electronic-polymer or polyacrylate films. Selected technologies created using vapor-coated fibers, textiles and plant matter will be described, including smart joint braces for movement sensing; garments for sleep monitoring; lightweight, small-form-factor supercapacitors that can be sewed or knitted into garments for wearable and portable energy storage; and flexible electrodes for bioimpedance spectroscopy.