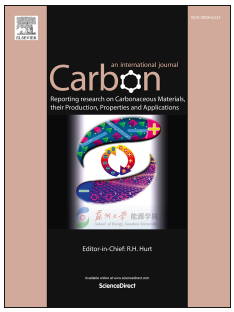
Accepted Manuscript



Carbons for wearable devices - Commentary and introduction to the virtual special issue

Yuan Chen, Liming Dai, Yutaka Ohno

PII: S0008-6223(17)30955-7

DOI: 10.1016/j.carbon.2017.09.079

Reference: CARBON 12409

To appear in: *Carbon*

Please cite this article as: Y. Chen, L. Dai, Y. Ohno, Carbons for wearable devices - Commentary and introduction to the virtual special issue, *Carbon* (2017), doi: 10.1016/j.carbon.2017.09.079.

Editorial

Carbons for wearable devices - commentary and introduction to the virtual special issue

The term **"**Wearable Devices" (WD) refers to a new class of emerging clothing and accessories incorporating electronic components or mini-computers that can be worn on the body comfortably. More invasive types of WDs may include smart tattoos and body implants. Regardless of their physical forms, WDs allow seamless access to electronics/computer interfaces and may provide smart functions, such as tracking physiological conditions of the body, or sensing and responding to various environmental stimuli from mechanical, thermal, chemical, electrical or magnetic sources.

Rising demands for enhanced wearability in WDs has introduced unique constraints on the selection of materials, and carbon materials stand out as promising candidates. We have thus witnessed an intensive research effort by the carbon community to create novel WDs by taking advantage of the desirable mechanical, electrical, chemical, and biological properties of carbon materials. To highlight the great potential of carbon materials in innovative WDs, our team of guest editors have organized a virtual special issue of the journal entitled "Carbons for Wearable Devices" (see journal home page at: www.journals.elsevier.com/carbon/.) In particular, our aim was to present the recent advances on how carbon materials can be tailored to realize different functions in WDs. We have selected 36 articles published in *Carbon* in the last two years, including 4 review articles and 32 original articles. They cover several application areas of WDs, including conductive fabrics or films, electromagnetic interference (EMI) shielding materials, electronic and optoelectronic devices, sensors, energy storage and generation devices, and a few other areas.

To facilitate the reading experience for the general audience, we start this virtual issue with a series of selected reviews. The first review article by X. Tao et al. presents an overview of sensors and sensing networks made from low-dimensional carbon nanomaterials and their composites for strain, pressure, surface bio-potential, gas, and temperature sensing applications [1]. The article emphasizes that the appropriate and deliberate selection of low-dimensional carbon materials, matrix and substrate materials, and their interactions, as well as effective structural designs, are essential for achieving sensitive and stable device performance. The second review article by J. Ahn et al. focuses on using (2D) graphene in designing bendable/flexible electronic components and devices, spanning from light-emitting diodes, detectors, photovoltaics, physical sensors, and biosensors to the energy storing/harvesting units [2]. The third review article by Q. Zhang et al. discusses the applications of (1D) carbon nanotubes (CNTs) in novel energy storage devices, including flexible and stretchable supercapacitors, and batteries [3]. The last review article by H. Peng et al. discusses flexible lithium ion batteries from the viewpoint of carbon material synthesis, structure design, and property optimization [4].

Many carbon materials have high electrical conductivity, thus they can be assembled with other non-conductive materials to create conductive fabrics or films, which constitute the basic component of many WDs. Five original articles are selected in