Su Yeon Choi, J Nanomed Nanotechnol 2016, 7:2 (Suppl)
http://dx.doi.org/10.4172/2157-7439.C1.028

Development of graphene nanoplatelet-based flexible sensor for detecting and monitoring of hazardous chemicals

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Described herein is a flexible and lightweight sensor made of a thin film composed of graphene nanoplatelet (GNP), which was printed onto flexible plastic (poly-ethylene terephthalate, PET) surfaces by using inkjet techniques. The flexible film sensor could selectively detect environmental hazardous chemicals such as acids (hydrofluoric acid, sulfuric acid, nitric acid, and hydrochloric acid) and petroleum (gasoline, diesel, and kerosene). Graphene, as a next generation electronic material, which is also the basic structure of all graphitic materials, is a one-atom-thick planar sheet of sp2 bonded carbon atoms in a honeycomb crystal lattice. GNP exhibits excellent electron transfer promoting ability for some species and excellent catalytic behavior toward small bio/molecules, which makes GNP extremely attractive for electrochemical sensors. The film sensor based on GNP take advantages of the increased electrode surface area, mass-transport rate and fast electron transfer compared to sensors based on bulk materials between other factors. However, the main challenge of how to improve the selectivity of the film sensors to the hazardous chemicals remains. In order to meet this requirement, the inducing of appropriate polymers, resins, and metal ions-specific functional groups onto the film with the desired properties was performed in this study.

Biography

Su Yeon Choi received her PhD degree in 2015 at INHA University and joined the Korea Electronics Technology Institute as a Post-doctoral fellow. Her thesis focused on the self-assembled nanostructure of conducting polymers in thin films and solution state. Her current research focuses on the development of graphene-based nanocomposites for various applications such as sensor, photocatalyst and supercapacitor.

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