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Editorial

Special Issue

Graphene-based Biosensors

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Since the groundbreaking experiments related to the two-dimensional (2DMs) material grapheneⁱ by Andre Geim and Kostya Novoselov the research and development in this area has increased in an impressive mode. Their interesting mechanical, electrical and optical properties combined with the known chemistry and the variety of their modification strategies have put 2D materials in the focus of biosensing community in addition to other application fields. The various forms of 2D materials in general and particularly those of graphene produced by physical, chemical or mechanical ways have shown to be very attractive as building blocks for sensors and biosensors.

This special issue gathers the recent tendencies in the application of various 2D materials in sensing and biosensing platforms.

The issue includes several research and review articles that cover interesting aspects related to the application of 2D materials in chemical sensors as well as biosensing applications for diagnostics and other areas. Graphene, as the first reported 2D materials, has a special attention in this special issue. Various forms of graphene materials from CVD to exfoliated one have been attracting the interest in biosensing field. Selective stamping of laser scribed reduced graphene oxide (rGO), hybrid graphene-gold nanoparticles, dopamine-functionalized GO, selenium modified graphene or even graphene-oxide-based molecular diagnostics for a broad range of applications that go from gases and pH detection to health related diagnostics (diseases such as hepatis B, Zika and dengue viruses, Lyme etc.), food analysis and other industrial applications are included.

A special attention is given also to other 2D materials that are emerging due to their attractive and advantageous properties with interest for biosensing applications. A molybdenum disulphide (MoS₂)-enabled optoelectronic biosensor for application in peptide detection or in-situ imaging of bacteria is also part of this special issue. In addition, the photoluminescence of CVD-grown MoS₂ modified by pH with interest for biological sensing as well as tungsten disulphide (WS₂) combined with graphene in a battery-free wireless photosensor on paper also are also included.

I wish this special issue will serve to 2D Materials readers being very useful to them to learn about the great capabilities 2D materials offer in the design of innovative biosensors for various applications. The review and research articles will be very useful for the evaluation of the state of the art of 2D Materials-based biosensing application as well as to inspire new ideas for research and application in this very interesting field.

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ⁱ Novoselov, K. S. et al. Science 306, 666–669 (2004)