Flexible graphene based transistor systems for measuring full-band electrophysiological signals

CSIC through the Instituto de Microelectrónica de Barcelona - Centro Nacional de Microelectrónica, the Catalan Institute of Nanoscience and Nanotechnology, the Institució Catalana de Recerca i Estudis Avançats, the Consorcio Centro de Investigación Biomédica en Red, and the Institut d'investigacions Biomèdiques August Pi i Sunyer have jointly developed a flexible graphene- based transistor for measuring full-band electrophysiological signals.

Industrial partners from the medical device sector, particularly from the neurology industry are being sought to collaborate through a patent licence agreement.

An offer for Patent Licensing

Full-band electrophysiological signals

Brain–computer interfaces and neural prostheses based on the detection of electrocorticography signals are rapidly growing fields of research. Several technologies are currently competing to be the first to reach the market; however, none of them fulfills yet all the requirements of the ideal interface with neurons. Thanks to its biocompatibility, low dimensionality, mechanical flexibility, and electronic properties, graphene is one of the most promising material candidates for neural interfacing. Published in nature materials (31 December 2018, https://doi.org/10.1038/s41563-018-0249-4).

A flexible and versatile graphene-transistor array, which provides amplification of signals and high-fidelity recording in a wide-bandwidth has been developed. The device can be applied to several biological systems such as brain, peripheral nervous, and heart.

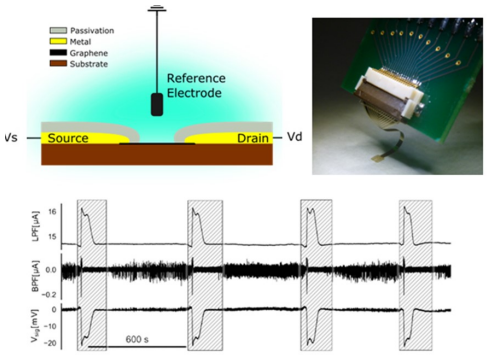

Fig.1) Flexible transistors system for neural applications.

Main innovations and advantages

- Record of infraslow signals.
- This device increases baseline stability that arises from the electrochemical inertness of graphene.
- Scalability from micro to macro.
- System flexible and adaptable to any geometry of different biological structures.
- From subdural, epidural and intracortical device application.
- Permits placements in the brain, peripheral and cranial nerves, heart, blood vessels, spinal cord and other biological structures.
- Non-invasive placement, similar to an electroencephalogram, is allowed.

Patent Status

Priority European patent application filed, suitable for international extension.

For more information, please contact:

PhD Isabel Gavilanes Pérez

Deputy Vice-Presidency for Knowledge Transfer.

Spanish National Research Council (CSIC)

Tel.: +34 93 594 77 00 ext. 2424

E-mail: Isabel.gavilanes@csic.es
comercializacion@csic.es