

Universal 3D scanner for biomarkers

High-precision sequencing and universal characterisation for use in biomarker research and DNA sequencing

ICN2 researchers have combined different 2D materials into a single patchwork membrane, creating layerable electrodes for high-resolution sequencing and 3D tomography of biomolecules at the micro- and nanoscales.

The device offers a label-free, functionalisation-free solution for the universal characterisation and sequencing of NA, proteins, exosomes and cells.

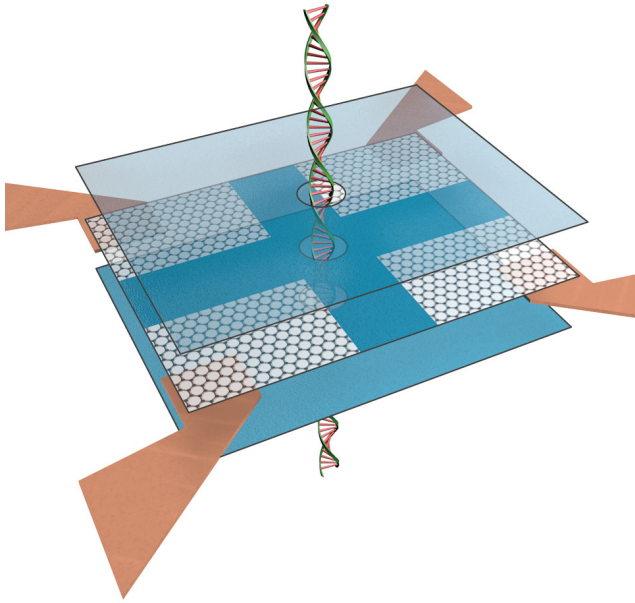
Catalan Institute of Nanoscience and Nanotechnology (ICN2)

Campus de la UAB
08193 Bellaterra
Barcelona, Spain

Knowledge and Technology Transfer Department
+34 937 372 649
technology.transfer@icn2.cat

Advanced Electronic Materials and Devices Group
www.icn2.cat





Patchwork membrane

Unlike in other micro- and nanopore sensors, this design combines 2D materials with different electrical properties into single hetero-structured membranes.

The result is a sensor device that enables precise control over the translocation speed and positioning of the biomarkers as they pass through the pore via dielectrophoresis. This affords the potential for impressive sensitivity, keeping the sequencing error rate low.

Layerable for 3D reconstruction of biomarkers

When layered, these electrode membranes enable measurements of the form and structure of the biomarkers to be taken along multiple axes. The resulting quasi-3D reconstruction of NA, proteins, exosomes and even whole cells makes this device a useful tool for their universal characterisation.

Main advantages for (D)NA sequencing

- ▶ Full control over translocation speed
- ▶ Reduced sequencing error rate
- ▶ 3D cross-sectional measurements of the DNA molecule

Main advantages for biomarker research and detection

- ▶ Label-free
- ▶ Functionalisation-free sensor
- ▶ 3D cross-sectional measurements of the biomarkers