

GRAPHENE-BIOSENSOR FOR HANDHELD BIOMOLECULAR INTERACTION ANALYSIS DEVICE

Label-free immunoassay

Background

We have developed a sensor platform based on the atomically-thin nanomaterial 'graphene'. Thanks to graphene's exceptional properties, it is possible to offer lab-like sensitivity in a small, portable device at an affordable price.

Using these single-layer nanomaterials, we have developed a handheld tool that can perform biomolecular interaction analysis for drug discovery.

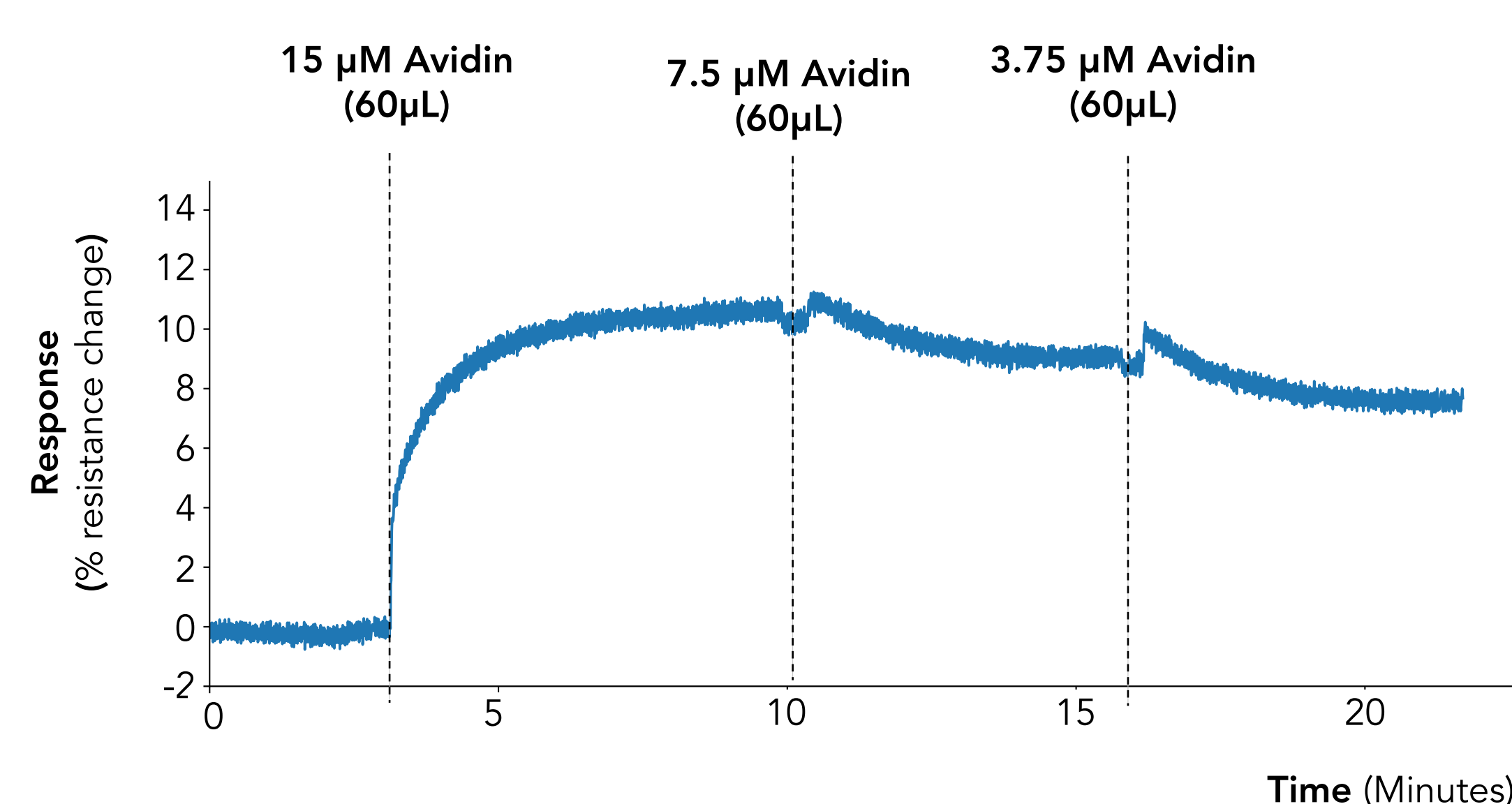
Working principle

"Field-effect transistor"

The graphene-channel is sensitive to electric charges. When the analyte binds to the immobilized antibody on the surface, this changes the electric charge in the vicinity of the graphene. As a result, the resistance of the graphene-layer changes, which is the signal that our reader detects.

Signal output

Avidin binding to antibody



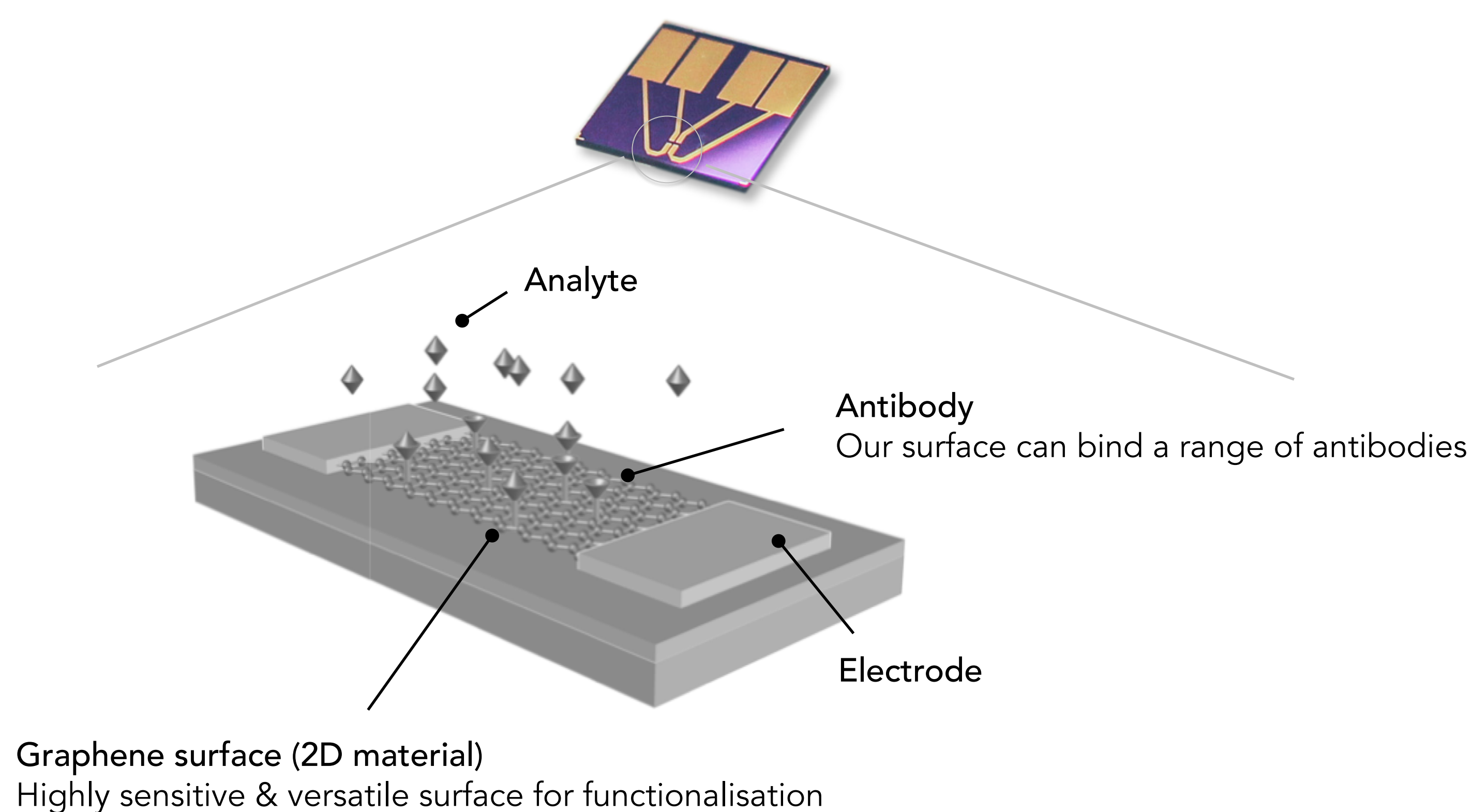
Experiment setup

- Sensor functionalized with Anti-Avidin AB
- Starting solution on sensor: 60µL Buffer Solution

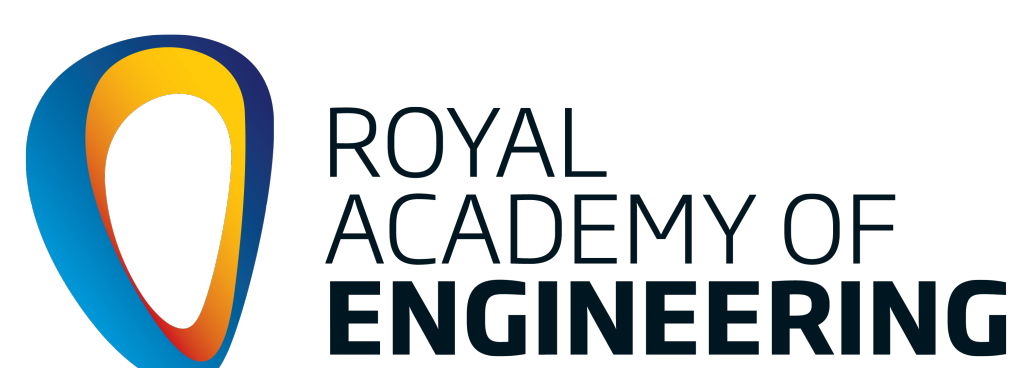
Performance findings

- Stable baseline with buffer PBS-Buffer
- Clear response to 15 µM Avidin (11% resistance change)
- Dissociation of Avidin can be recorded

Reader & sensor cartridge



Work supported by



Authors

Ruizhi Wang^{1,2}, Lukas Vasadi², Brice Darroch¹, Christoph von Bieberstein¹, Stephan Hofmann²

1 HexagonFab Ltd, Cambridge, United Kingdom, 2 Department of Engineering, University of Cambridge