

Field Detection Platform based on CVD Graphene for in-field analytics in Industry, Healthcare and Environmental Sciences

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We present a fabrication method for integrating Field Effect monolayer graphene Sensors and its integration into a portable device for monitoring trace analytes in the field.

As a practical example, we will showcase a waterborne pollution device capable of dosing trace amounts of Polyfluoroalkyl compounds (PFAS). PFAS form a class of approximately 12,000 chemicals, are widely used due to their unique properties and are found at millions of sites across all industrialized countries.

Due to their persistence, toxicity, and bioaccumulation, PFAS are termed 'forever chemicals', posing significant health and environmental risks. Detecting and monitoring PFAS contamination, traditionally reliant on complex and costly laboratory equipment, has become a global priority. To address this, Grapheal has developed a credit card-sized electronic sensor capable of on-site sampling tests. This device demonstrated detection limits for PFOA (a common PFAS compound) of 300 ng/L, below the EU regulatory limit of 500 ng/L in drinking water. The device's high sensitivity and ease of use facilitate quantitative in situ detection, aiding in pollution mapping and long-term monitoring. Produced with printed electronics and a graphene sensor, it boasts a low environmental impact, reducing the financial burden of frequent water analyses.

We will conclude by providing an overview of other projects including healthcare applications for wearables.

References

- [1] <https://ala.associates/product-launch/grapheal-and-edytem-laboratory-fine-tune-portable-sensor-for-detecting-water-borne-pfas/>

Figures



Figure 1: Credit-card format of the RFID powered sensor produced by Grapheal.