

Adapting bioassays for point-of-care applications

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Nowadays, the use of specialised equipment to do research is not the only option we have, especially in the field of biosensors where portability and low cost are key factors. Sensitivity, another fundamental aspect, does not have to be compromised, as current technologies available allow practically the same at an affordable price. The smartphone is a clear example of the above-mentioned featuring camera and data processing functions unprecedented in the last few years. In this talk aimed at enthusiastic young researchers, I will give an overview of how to build devices based on simple electronics together with smartphone technology, e.g. a paper-based electrophoretic bioassay, a portable ELISA plate reader and a method based on laser-scribing to produce and stamp reduced graphene oxide.

References

- [1] Giacomelli, C., Álvarez-Diduk, R., Testolin, A., & Merkoçi, A. (2020). Selective stamping of laser scribed rGO nanofilms: from sensing to multiple applications. *2D Materials*, 7(2), 024006.
- [2] Sena-Torralba, A., Alvarez-Diduk, R., Parolo, C., Torné-Morató, H., Müller, A., & Merkoçi, A. (2021). Paper-Based Electrophoretic Bioassay: Biosensing in Whole Blood Operating via Smartphone. *Analytical Chemistry*, 93(6), 3112-3121.
- [3] Sena-Torralba, A., Álvarez-Diduk, R., Parolo, C., Piper, A., & Merkoçi, A. (2022). Toward Next Generation Lateral Flow Assays: Integration of Nanomaterials. *Chemical Reviews*.
- [4] Bergua, J. F., Alvarez-Diduk, R., Idili, A., Parolo, C., Maymó, M., Hu, L., & Merkoçi, A. (2022). Low-cost, user-friendly, all-integrated smartphone-based microplate reader for optical-based biological and chemical analyses. *Analytical Chemistry*, 94(2), 1271-1285.

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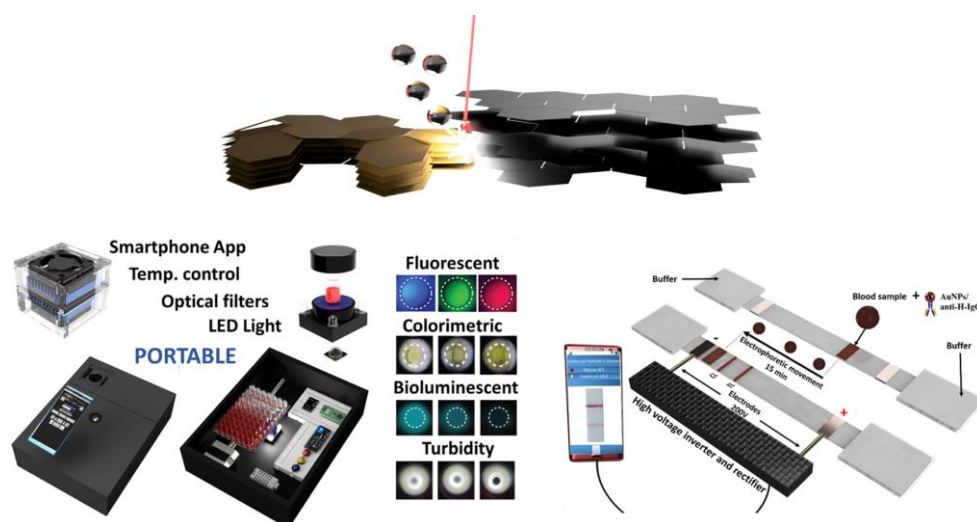


Figure 1: Example of a laser assisted method of rGO production, and portable devices for biosensing applications