

Monolayer graphene on parylene for biology and medicine: from lab to medical devices

Vincent BOUCHIAT

¹Grapheal, 25 av Martyrs, Grenoble, France

info@grapheal.fr

The mass production of single layer graphene film by CVD on Copper foil has enabled the production of disposable biosensing devices with competitive pricing. We present a technology enabling the mass production a line of sensors based on graphene/polymer films. It combines in the same film biocompatibility (1,2), mechanical flexibility, optical transparency and high electronic mobility enabling Ion sensitive Field effect sensing with precision competing with the best GFET based on silicon wafer substrate technology (3). At Grapheal, we have explored the use of graphene-on-polymer for enabling at the same time biosensing and tissue engineering (4) with integration to RFID component (5) to enable direct smartphone connectivity (6)

A primary area of our activity lies in the development of next generation connected biosensors, enabling highly sensitive and rapid detection for medical diagnostics.

I will show the application of graphene surface functionalization to implement sensitive and selective biosensors. In particular, we are actively scaling up production and integrate our line of sensors into digital solutions such as :

- IOT sensors for Point of Care diagnostics and remote patient monitoring (POC diagnostics)

References

- [1] A. Bourrier et al. Adv. Health. Mat. 8 , 1801331, (2019) doi : 10.1002/adhm.201801331
- [2] F. Veliev, et al., Biomaterials, Elsevier, 86, pp.33–41 (2016).
- [3] F. Veliev et al. doi : 10.3389/fnins.2017.00466 (2017)
- [4] Le Gall et al. doi : 10.1101/2021.05.16.444337 (2021)
- [5] S Sharma, et al. Advanced Materials Technologies 8 (15), 2300163 (2023) doi [10.1002/admt.202300163](https://doi.org/10.1002/admt.202300163)
- [6] <https://www.testnpass.com>

Figures



Figure 1. Grapheal's solutions from portable sensors (TestNpass) to smart bandage (WoundLAB, right)



Figure 2. Grapheal's solutions smart bandage (WoundLAB, right)