Graphene biosensors for rapid field detection of biomarkers and trace pollutants: From lab validation to mass market applications

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The mass production of single layer graphene film by CVD on Copper foil by Roll-to-Roll processing 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 Field effect sensing with a precision matching 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 and environmental monitoring.

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 :

- Field sensors for Water quality and Environmental monitoring (PFAS detection in water)
- IOT sensors for Point of Care diagnostics and remote patient monitoring (POC diagnostics for Alzheimer detection in blood)

References

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Figures

Figure 1: (Left) benchtop sensors solution based on GraphLAB instrumentation , (Right) Portable field-deployed sensors based on the TestNpass technology (right) .