

Scaling the production of high-quality graphene devices for sensing applications

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Abstract

Thanks to its unique electronic properties, graphene has great potential to produce ground-breaking devices for a wide variety of industries. However, a key challenge remains: to translate the required low defect level high mobility graphene from lab device demonstrators to production scale. Paragraf has realised this by being the first company in the world to produce graphene using our proprietary and commercially scalable growth method directly onto target substrates, using standard semiconductor manufacturing tools. [1] Paragraf covers all aspects of production, from the growth of graphene to processing into final devices, which has enabled the demonstration of industry-ready magnetic- and bio-sensing products for a range of applications.

We have demonstrated graphene magnetic hall-effect sensors with a sensitivity significantly beyond silicon [Fig1], enabling applications in automotive industries such as positional, rotational, and current sensing. They offer high resolution, instantaneous response, wide measurement range, low power consumption, and ease of use. Further details can be found in Dr Lok Yi Lee's poster presentation "Improved graphene-based Hall effect sensors through control of defect levels in graphene".

Graphene biosensors enable sensitive, real-time measurement of biomolecules directly from samples without enrichment or amplification, reducing both time to result and cost without sacrificing accuracy. The recent acquisition of Cardea Bio-Inc, now Paragraf USA, enables the use of mass-produced, transfer-free monolayer graphene to manufacture the state-of-the art graphene-based biosensor products developed by the US team over the last ten years [2].

References

- [1] Thomas, S. "A method of producing a two-dimensional material", WO2017029470
- [2] <https://paragraf.com/paragraf-acquires-cardea-bio-to-extend-graphene-electronics-industry-leadership/>

Figures

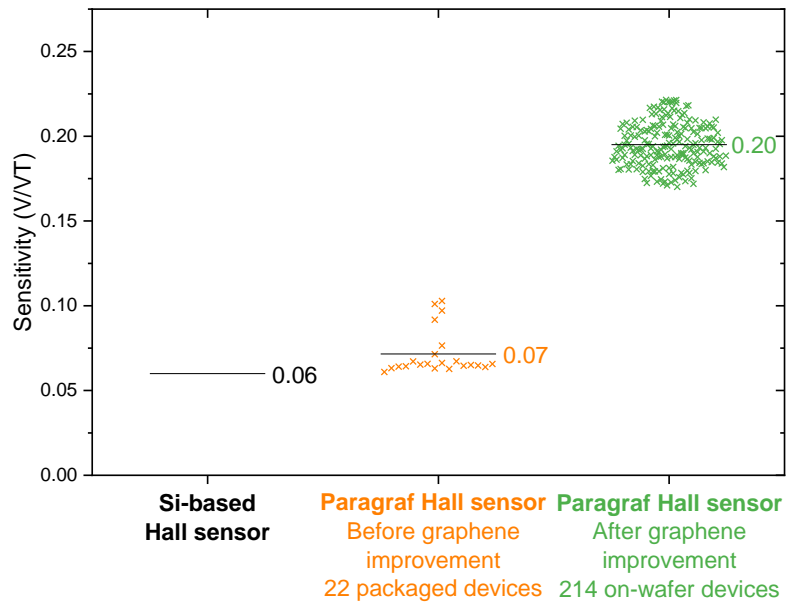


Figure 1: Recent advancements in Paragraf Hall Sensor performance