Archer Materials
Technology

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ASX Announcement (ASX: **AXE**) 31 July 2023

Archer further enhances biochip gFET design for advanced sensing and sends to commercial foundry partner

Highlights

- Archer Materials has advanced its biochip gFET design to improve its detection and control capabilities which link to the goal of single device multiplexing.
- The advanced gFET design is aimed at allowing the biochip to handle liquid samples to test for multiple diseases at once on a single chip, with potential for re-use capabilities.
- Archer has improved its biochip system capabilities towards automated data analysis so end users can extract high quality data with greater efficiency.
- The advanced gFET design has been sent to an additional foundry partner for a whole wafer run for validation, with delivery of chips expected by the end of 2023, and represents a critical milestone in the commercialisation pathway for Archer's biochip.

Archer Materials Limited ("Archer", the "Company", "ASX: AXE"), a semiconductor company advancing the quantum computing and medical diagnostics industries, has developed a next generation biochip fabrication to better detect and control disease samples on a single graphene field effect transistor ("gFET") design. The design has been sent to a commercial foundry partner for a whole four-inch wafer run for validation.

The first-generation hardware and software in the system platform announced on 13 July 2023 was designed to run using a chip with single isolated gFETs as sensors, as gFETs offer an ultrasensitive approach to analyte detection over conventional electronic sensors used in current lab-on-a-chip devices.

Archer's next generation gFET design is now paving the way for an early biochip system platform that has single-device multiplexing, meaning the biochip technology would be able to sense different liquid samples to test for multiple diseases at once.

This more advanced design is a critical milestone in the commercialisation pathway for the biochip, which will potentially enable end-users to detect multiple diseases from one single chip.

The gFET design also has functional surfaces and components, for both the sensor and control of the biochip platform. There is also an integration of gFET design components that allow for the real-time fine tuning and control of the electronic properties of the graphene. This has the potential advantage of biosensors that are re-usable, leading to an extended device lifetime.

In addition, Archer has improved its biochip system platform testing capabilities to develop a more accurate sensor. The upgraded automated testing platform conducts both control software and readout hardware with improved efficiency. The software is also progressing towards automated data analysis, so end users can extract high quality data.

This new more complex gFET design complements the proof-of-concept biosensing gFET announced on 13 July 2023. The earlier design was submitted to a commercial foundry for a Multi-Project Wafer run, with the completed devices expected to be delivered by the end of 2023. Archer expects the advanced gFETs on a single four-inch wafer to be delivered by the additional commercial foundry partner by the end of 2023.

Background

The new advanced device designs which are the subject of this announcement have now been submitted to a foundry in the Netherlands for a whole wafer run (the previous 'simpler' design was submitted to a foundry in Germany for a Multi-Project Wafer ("MPW") run). An MPW is where Archer's device design is imprinted on a small area of a wafer with the designs of other companies on the same wafer. The new more complex gFET design will be fabricated all over one, stand-alone four-inch wafer.

The new advanced gFET device design and whole wafer run in a commercial foundry is an example of how Archer is now moving towards a streamlined commercialisation model that closely aligns to the 'fabless' model (i.e. Archer focuses on designing and developing its chips and outsources the manufacturing to specialised foundries). The new gFET device designs and related processes form the basis of intellectual property that is 100% owned by Archer.

Commenting on the more advanced gFET design, Dr Mohammad Choucair, CEO of Archer, said,

"Archer continues to build on the core of its biochip technology, the gFET, and this more advanced design not only improves the chip's detection and control abilities for multiple diseases from one single chip, but it also extends its use-time and brings it closer towards commercialisation.

"We continue to add to our strategic partnerships within the semiconductor supply chain, and our new foundry partner, which has the new gFET design in hand for a whole wafer run, represents a key step in this path to commercialising the biochip.

"As the medical community looks to better detect and analyse disease to help improve patient outcomes, the gFET device design is on track to detect multiple disease at once and improve the future operation for the end users of Archer's biochip."

The Board of Archer authorised this announcement to be given to ASX.

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About Archer

Archer is a technology company that operates within the semiconductor industry. The Company is developing advanced semiconductor devices, including chips relevant to quantum computing and medical diagnostics. www.archerx.com.au