Archer Materials
Technology

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ASX Announcement (ASX: **AXE**) 11 March 2024

Archer miniaturises Biochip gFET chip design

Highlights

- Archer Materials has advanced its Biochip gFET chip design with a significant reduction in size.
- The Biochip size reduction was achieved by Archer personnel redesigning the layout of the circuits creating the gFET transistors.
- Archer has sent the miniaturised chip designs for fabrication to a foundry partner, Applied Nanolayers ("ANL"), based in the Netherlands.
- The miniaturised chips will undergo wafer dicing, assembly, packaging and related electrical testing at Archer's newly established outsourced semiconductor assembly and testing ("OSAT") partner, AOI Electronics in Japan.
- The delivery of the new miniature packaged chips is anticipated in mid-2024.

Archer Materials Limited ("Archer", the "Company", "ASX: AXE"), a semiconductor company advancing the quantum computing and medical diagnostics industries, has designed a miniaturised version of its Biochip graphene field effect transistor ("gFET") chip for fabrication at a commercial foundry.

The Archer Biochip contains a sensing region of which the gFET is the core component. Each gFET chip contains multiple gFETs, each of which is a transistor, which acts as a sensor. Archer has miniaturised the total chip size by redesigning the layout of the circuits creating these gFET transistors. The new miniaturised design has been sent to a foundry partner for a whole-wafer fabrication of reduced size gFET chips, which Archer intends to integrate with other parts of the Biochip technology.

The new gFET chip design has been significantly reduced in size over earlier designs of 10mm x 10mm to 1.5mm x 1.5mm. It will be tested on a four-inch wafer which is expected to produce 1375 chips on it, compared to the 45 chips produced using earlier designs in previous four-inch wafer fabrication runs.

The chip will be fabricated by Applied Nanolayers ("ANL"), based in the Netherlands, which has fabricated earlier designs of Archer's gFETs (ASX ann. 14 Sept 2023). Independent to wafer runs at ANL, Archer has also sent gFET designs to a foundry in Spain for fabrication, with delivery anticipated within the first half of 2024 (ASX ann. 11 Dec 2023).

Archer applies the 'fabless' chipmaker model by designing, researching, and developing its chips, while outsourcing manufacturing to specialised companies in the semiconductor supply chain. This includes the creation of a new miniaturised Biochip gFET chip design, sending the design for a whole wafer run in a commercial foundry, and deciding on the chip assembly and semiconductor device electronics packaging and related electrical testing.

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The wafer will be diced and assembled at Archer's newly established outsourced semiconductor assembly and testing ("OSAT") partner, AOI Electronics in Japan. The OSAT includes moulding, dicing, and lead frame design for this dedicated wafer assembly, and also device electronic shorting and related packaging testing. These new capabilities are key in advancing the Biochip development to interfacing and integration with miniaturised gFET chip sensor designs. Delivery of the packaged chips is anticipated in mid-2024.

Background

Archer's Biochip innovation is focused towards integrating gFETs into advanced fluidic systems to create miniaturised lab-on-a-chip platforms for medical diagnostics. If successful, this could enable the ability to parallelise the detection of biologically relevant targets on a chip.

Archer Materials has previously confirmed the fabrication and electrical conductivity of earlier generations of gFET chip designs by the manufacture of chips at semiconductor foundries in Europe. The current development which is subject to this announcement follows Archer's progress on gFET chip designs for parallelised (multiplexed) sensing through four-inch wafer runs by ANL (ASX ann. 14 Sept 2023).

Archer continues to strengthen its relationships with global foundry partners.

Commenting on the miniaturisation of the Biochip gFET chip design, Dr Mohammad Choucair, CEO of Archer, said,

"The significant reduction in the size of the Biochip was a great achievement by the Archer team. We have developed in-house expertise and know-how in gFET chip design.

"By working with Applied Nanolayers and AOI Electronics on the miniaturised gFET chips, we are strengthening our relationships with semiconductor supply-chain partners."

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 technology and medical diagnostics. Archer utilises its global partnerships to develop these technologies for potential deployment and use across multiple industries. www.archerx.com.au