Archer Materials
Technology

Archer Materials Limited (ACN: 123 993 233)
Lot Fourteen, Frome Road, Adelaide SA 5000
www.archerx.com.au

ASX Announcement (ASX: **AXE**) 28 November 2024

Archer steps closer to feasibility stages and improves testing accuracy of Biochip

Highlights

- Generating potassium sensing datasets for chronic kidney disease testing on Biochip graphene field effect transistor (gFET) sensors.
- Making improvements in operation, processing, and design of the gFET sensors.
- Testing stability of latest gFET devices from foundry partners.
- Developing conditioning procedures to maximise precision of measurement in blood potassium levels.
- Currently undertaking initial benchmarking of gFETs with collaborators at RMIT University.

Archer Materials Limited ("Archer", the "Company", "ASX: AXE"), a semiconductor company advancing the quantum technology and medical diagnostics industries, has begun testing to transition into feasibility stages of product development, along with making improvements in operation, processing, and design of the graphene field effect transistor ("gFET") sensors for its Biochip technology (See ASX announcement 27 August 2024).

Archer has built a dataset of gFET performance for foundry batch-to-batch repeatability and has investigated device stability across testing conditions and time periods. The data sets are key inputs to the feasibility development program for the Biochip gFET in the use of blood potassium testing for chronic kidney disease.

The team achieved this by developing a first version electrical conditioning procedure that sets the individual gFETs to a condition of high test-to-test repeatability. The procedure results in an improvement of up to 10 times in sweeping voltage repeatability, which directly translates to better potassium measurement accuracy. This is critical to achieve the high accuracy measurements required for blood potassium levels in chronic kidney disease.

Example results from the Biochip team show the sensor electrical response to a relevant range of potassium concentrations, as represented in figure 1. The team has made progress in establishing a baseline for repeatability and sensitivity. Over the coming months, work will be directed to what influences this and continuous improvement via sensor operation, fabrication, and design, to meet potassium accuracy specifications.

For example, when looking to detect a 20mV response from the sensor, the measurement variation needs to be much less than 20mV. Initial data in figure 1 illustrates the progress so far in terms of those metrics.

Archer Materials Limited (ACN: 123 993 233)
Lot Fourteen, Frome Road, Adelaide SA 5000
www.archerx.com.au

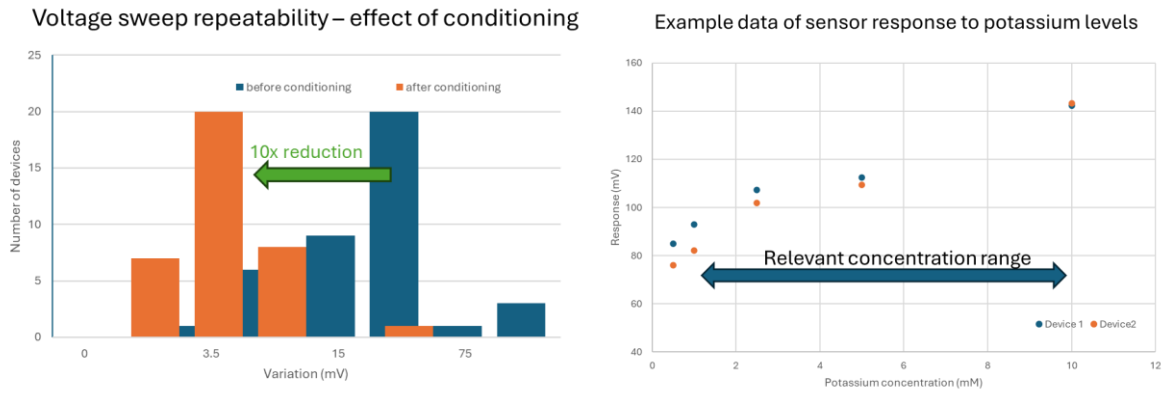

Figure 1. The chart on the left shows how a population of individual gFETs from a wafer perform in terms voltage response repeatability. Before the conditioning most of the devices have a 20-50mV variability (large compared to the voltage responses we detect as a function of potassium concentration – right plot). However, after an electronic conditioning procedure, this metric decreases to 2-5mV which reduces the potassium measurement error significantly. Chart on the right is representative data from two sensors. The voltage response is plotted as a function of potassium levels in solution applied to the sensor (relevant concentrations for kidney disease).

The Archer team has also completed a round of benchmarking experiments with collaborators at RMIT University. The aim of this work is to further validate the performance entitlements of gFETs versus other types of electrochemical biosensors. The results are being analysed to prepare for follow-up work.

Commenting on the gFET developments, Greg English, Executive Chair of Archer, said,

"The Archer team has made some important progress in bringing the Biochip to the feasibility stages and improving the accuracy for testing blood potassium levels for chronic kidney disease.

"These developments are key in the ultimate purpose of the Biochip, which is to bring the testing of chronic kidney disease into the home and therefore improve patient outcomes through better diagnosis and treatment."

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

Investor enquiries

Eric Kuret
+61 417 311 335
eric.kuret@automicgroup.com.au

Media enquiries

Dylan Mark
+61 475 783 675
dylan.mark@automicgroup.com.au

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