



Ultrafast Nanocube Memory Results

ASX listed Strategic Elements Ltd (ASX:SOR) has released performance results establishing its Nanocube memory ink as one of the **world's leading printable memory** technologies. This positions SOR and its shareholders at the forefront of the rapidly growing multibillion-dollar printed electronics sector. The technology was licenced from the University of New South Wales and a team from the university has been contracted to assist with development.

- The prototype fabricated with Nanocube memory ink on silicon substrates achieved data writing speeds over **1000 times faster than today's state-of-the-art flash memory** technology used in most wearable devices and smartphones. This is significant as a faster data writing speed enables a device to run more complex applications.
- The memory ink also required up to **40% less voltage than existing memory technology** used in these devices. Again, this is significant as a lower voltage requirement enables a device to be operated with lower power, thus being used longer.
- The prototype fabricated with Nanocube memory ink on **flexible and transparent plastic** achieved data writing speeds up to **10 times faster** than the leading commercialised **flexible plastic** memory.
- The memory ink required up to **3 times less voltage** than the leading commercialised **flexible plastic** memory.

Opportunity

Printed electronics has rapidly emerged to become a multibillion-dollar global market. Memory is at the heart of creating products with more complex functions and applications. To date, there is currently no commercialised **high performance** printed memory technology.

Therefore, the Nanocube memory ink has significant **disruptive** potential **in part** due to its high performance characteristics. The ability to incorporate high performance printable memory into existing products for the first time across many industries (e.g. military, infrastructure, clothing, etc.) could dramatically disrupt a sector already forecast to reach USD 78 billion by 2023.

The UNSW School of Materials Science and Engineering is a leader in their field and are ranked number one in Australia. Professor Sean Li, who leads the team that have spent years developing the technology said, *"Rapid innovations in printing technology over the last few years mean the Nanocube ink could hold enormous potential for a range of future industries. This technology should not be underestimated."*

Next Steps

In the short term, the Company will focus on showcasing the unique advantages of the technology. The Nanocube memory ink will be tested on **glass** materials for potential use in the infrastructure sector. Endurance testing will also be completed. In addition, different materials from large companies such as Kodak (flexible plastics), Dupont (conductive inks) and Corning (glass) will be trialled to see which specific products enhance the performance of the memory ink even further. The Company will consider potential commercial partners' specific requirements prior to releasing technical specifications of the Nanocube memory ink.

Strategic Elements Managing Director Mr Charles Murphy said, *"The team at UNSW have done an enormous amount of work within such a short time frame. The high speed and low voltage performance results are fantastic when considering this is the very first prototype. There are many options where we think the technology can be significantly improved even further. Producing these levels of results from a memory ink technology is truly an achievement."*

Strategic Elements

ASX listed Strategic Elements Ltd operates under the Federal Government's Pooled Development Fund Program. Under this program the Company takes capital it raises through the ASX and invests it into Australian innovation. In return, the Federal Government enables the Company's **shareholders to pay no capital gains tax** on their shares or tax on dividends.

Mr Murphy also said *"This sector is wide open for new memory technologies. Printed electronics removes the need to manufacture within traditional semiconductor fabrication plants and opens up opportunities for smaller emerging companies. There is so much collaboration and partnering occurring in the sector."*

The Technology

Low cost traditional printing processes combined with advanced inks and new forms of flexible materials and glass to put electronics where they could never go before e.g. wrapped around curved surfaces, attached to clothing or on building infrastructure.

The nanocube ink is made from cerium oxide and is comprised of billions of tiny cubes that are roughly 10 nanometres thick, or about 10,000 times smaller than the thickness of a sheet of paper. When placed in a solution and deposited onto a conductive surface, the cubes self-assemble; first, they form a coordinated square array, then they stack on top of each other like Lego, building up layer by layer.

Digital information (a series of ones and zeroes) is encoded and stored on the nanocube memory cells by applying an electrical current, which changes the cell between a resistive and conductive state.

License

ASX listed Strategic Elements Ltd 100% owned Company Australian Advanced Materials has an exclusive global licence for the technology from UNSW. It has also contracted the materials group at the UNSW School of Materials Science and Engineering to assist in developing a nanocube memory prototype, improving the technology and creating new intellectual property.

ASX Listed Strategic Elements Ltd

The Company has a special registration from the Federal Government as a Pooled Development Fund. Most shareholders pay no capital gains tax when they sell their shares in ASX listed Strategic Elements (ASX: SOR). More information can be found on the Company's website at www.strategicelements.com.au.

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