



SOR Unique Printable Memory Technology Wins Federal Funding

Perth, Australia, 30 July 2020 – Strategic Elements Ltd (ASX:SOR) is pleased to report that a collaborative Project to develop Printable Memory technology with the University of New South Wales and CSIRO has won significant funding from the Australian Federal Government. Funding from the Australian Research Council Linkage program will be used to significantly enhance the Nanocube printable memory technology owned by subsidiary Company 'Australian Advanced Materials (AAM).

The Project will be led by UNSW Associate Professor Dewei Chu, co-inventor of the Nanocube Memory Ink and will produce metal oxide based nanomaterials for printable, flexible and cost-effective memory devices. The project aims to develop next generation printable memory devices with low cost and excellent stability. The expected outcomes will be new electronic materials for a wide range of uses in flexible electronics and significant advances in energy efficient data storage devices. IP and commercialisation rights remain with AAM.

The Nanocube Memory Ink is a liquid transparent ink containing billions of tiny nanometer scale particles. The data storage technology is physically printed onto surfaces (glass, plastics) introducing electronic memory to surfaces where current silicon chip technology cannot go. The exploding increase in digital communications from 5G, Big Data and Internet of Things (IOT) has generated an urgent need for new memory materials and devices with low power consumption, nonvolatile storage capabilities and mechanical flexibility.

Comment

SOR Managing Director Mr Charles Murphy said: *"To have successfully pulled together a collaborative Project in excess of \$1,000,000 focused on developing our Nanocube Memory Ink technology is a great win for the Company in the current environment. UNSW in particular have been a strong partner for us and our win-win relationship is a great example of industry and research working together to further Australian technology commercialisation".*

UNSW Associate Professor Dewei Chu commented: *"We have a strong collaboration with Australian Advanced Materials and are extremely pleased to see the Commonwealth Government is investing in printable memory technology which will have great potential in next generation wearable electronics.*

Project Resources and Advanced Facilities

Total budget for the collaborative Project is approximately **\$1,0690,00** (up to three years). The Australian Research Council Linkage funding provides \$320,000 in cash. Australian Advanced Materials is providing \$160,000 in cash and \$150,000 in-kind support and services. CSIRO is providing approx. \$25,000 in-kind support and services. The University of New South Wales is providing \$414,000 in-kind support and services.

The Project will be strongly supported by UNSW with a significant contribution across the University from The School of Materials Science and Engineering, Faculty of Science, and Central Strategy Funds. The team combines interdisciplinary scientists in the areas of nanotechnology materials, electronic materials and devices and computational materials and physics. Given the complementary expertise of the lead investigators, the addition of a full time research associate and multiple PhD students the Project will assist to develop significant potential technical breakthroughs.

State-of-the-art Research Facilities: UNSW has established a materials chemistry laboratory at the School of Materials Science and Engineering. The laboratory is equipped with state-of-the-art facilities for energy and information storage materials fabrication, printing and electrochemical properties characterization. UNSW has a large electronic device laboratory which is capable of characterizing various electronic devices.

The team will have access to all of the necessary facilities required to undertake the Project, including analytical and EM facilities located at the UNSW Analytical Centre, fabrication facilities located at the Australian National Fabrication Facility node at UNSW and *via* proposals to major facilities such as CSIRO, the Australian Synchrotron and ANSTO. In particular, CSIRO Manufacturing research is based on multi-disciplinary scientific and engineering capabilities and uses world-class infrastructure.

Supercomputing Facilities: The team has also gained access to state-of-the-art Australian Supercomputer facilities, including the National Computational Infrastructure (Raijin) and Pawsey Supercomputer Centre (Magnus) through the National Computational Merit Allocation Scheme and Pawsey Energy and Resources Merit Allocation Scheme.

Improved Printability

One of the key challenges in printing memory ink is the formation of cracks during post-annealing process, which greatly compromises the device yield and reliability. The Nanocube technology has previously demonstrated a breakthrough in this area by enabling low temperature processed, crack-free resistive switching layers by slot die coating. In this Project, the team will further develop scale up printing technologies for A4 size resistive switching materials on various substrates with improved uniformity and mechanical flexibility.

Programmable Memory Arrays

Using previous fundamental work in printed electronic devices, the team will focus on how to optimally assemble memory ink layers, selecting elements, and electrodes into memory arrays. The team will also utilize advanced characterization techniques to rationalize electrical and mechanical performance.

Nanocube Memory Ink Technology Background

The Nanocube technology was hand-picked to be one of only approx. 20 from around the world to demonstrate at the world's premier Printed Electronics event 'IDtechX' in Berlin May 2020. Commenting on the recent Nanocube technology demonstrator IDtechX CEO Raghu Das stated "***I genuinely think it's one of the best developments I've seen in a while in printed electronics.***" The event is being rescheduled due to the impact of the Corona Virus.

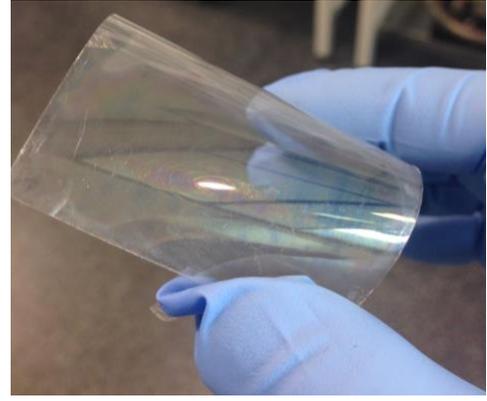
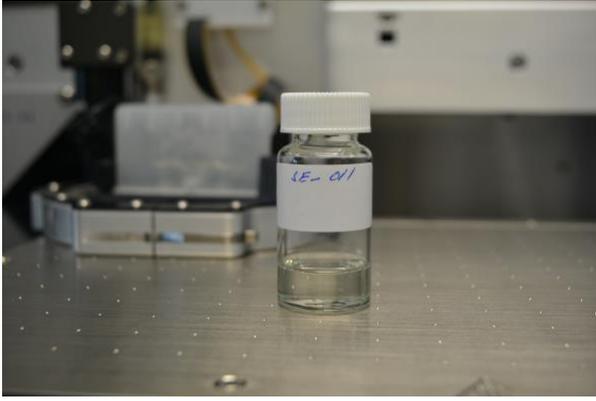
Please see a video on the demonstrator here <https://vimeo.com/386335109/5a8d162249>.

AAM is 100% owned by Strategic Elements Ltd

- AAM licensed the underlying Nanocube Ink technology from the University of New South Wales.
- Multiple application potential, however most development to date focused on memory/data storage aspects of the technology.
- UNSW is globally recognized as a leading research institution in Materials Science and Engineering. Dr Chu, co-inventor, is recognised for his contribution to oxide nanoelectronics, including RRAM and TFT. Research and development work has also been progressed with teams from VTT Finland and the CSIRO Australia. AAM is also a member of PrintoCent in Oulu, Finland.

The Nanocube Ink technology has multiple application potential

- The first application is a RRAM technology for storage and memory, the Nanocube Memory Ink.
- The Nanocube Memory Ink is a transparent ink containing billions of nanometre scale particles. When printed onto a surface and assembled with electrodes they operate as computer memory.
- Current memory technology is restricted to RF sputtering onto more rigid silicon materials in semiconductor fabs. Whereas the Nanocube technology is a fully printed, transparent memory technology fabricated at room temperature onto non-silicon materials.
- Favorable properties for Printed Electronics applications, particular those that benefit from locally stored data.
- Delivering storage on glass and plastic for transparent, structural and/or flexible electronics (**freedom of design forces a re-think of new electronics product applications and categories**).
- US Patent granted in January 2020 related to RRAM memory and methods of manufacture. Pending patent applications related to further aspects of this technology



Strategic Elements

The Australian Federal Government has registered Strategic Elements as a Pooled Development Fund with a mandate to back Australian innovation. Strategic Elements operates as a 'venture builder' where it generates high risk-high reward ventures and projects from combining teams of leading scientists or innovators in the technology or resources sectors. Most investors in SOR pay no tax on capital gains from selling their SOR shares as the Company operates under a Federal Government program setup to encourage investment into innovation. The Company is listed on the ASX under the code "SOR". More information on the Pooled Development Program should be read on the Company's website at www.strategicelements.com.au

This announcement was authorised for release by Strategic Elements' Board of Directors.

For Company Information:

Mr Charles Murphy, Managing Director

Phone: +61 8 9278 2788

admin@strategicelements.com.au www.strategicelements.com.au