Media Release
27 October 2020
ASX: SOR

SOR Developing Flexible Self-Charging Battery

Perth, Australia, 27 October 2020 – Strategic Elements Ltd (ASX:SOR) subsidiary Australian Advanced Materials has agreed to develop a **self-charging** battery technology through its collaboration with the University of New South Wales and CSIRO. The Battery cells **create electricity from humidity in the air or skin surface** to self-charge themselves **within minutes.** No manual charging or wired power is required. They are created with a **printable ink** and are ideally suited for use in Internet of Things (IOT) devices. The global **battery market** for IOT was worth USD 8.7 billion in 2009 and forecast to be USD 15.9 billion in 2025[1].

The **Battery Ink** will be developed by integrating significant existing ink formulation and printed electronics intellectual property from the Company's **Nanocube Memory Ink** technology with an **advanced graphene oxide** material. Strong potential competitive advantages exist over lithium based batteries that suffer from weight, safety (flammable) and needs a constant power supply to recharge.

Lithium Batteries	Battery Ink Cells
- manually charged or plugged into power	- self-charging in minutes
- inflexible	- flexible
- potentially flammable	- not flammable
- comparatively heavy	- extremely thin and light
- environmental issues	- environmentally friendly

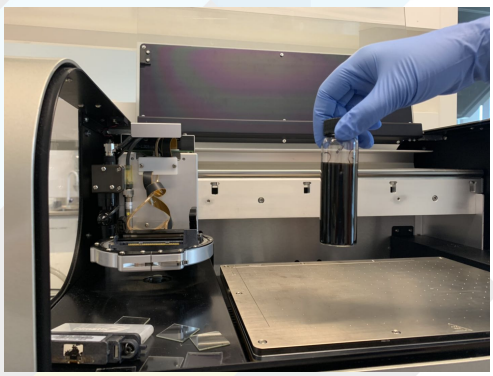
SOR Managing Director Charles Murphy said: *"Early stage results are extremely promising as we apply years of experience and intellectual property in electronic inks into the development of a Battery Ink that generates electricity from the environment. From the Automated Robotic Security Vehicle we are building with US giant Honeywell, the ongoing commercialisation of the Nanocube Memory Ink, this new development in Battery Ink and other commercial activities on the horizon, SOR is generating significant momentum".*

Development

Benefiting from exceptional physicochemical properties, graphene-based materials are able to harvest energy from external factors such as moisture and heat. Graphene oxide is formed by the oxidation of graphite which is cheap and readily available.

Graphene oxide is dispersible in water and other solvents. Materials engineering is being conducted by the world leading electronic materials team at UNSW. **Early stage work with graphene oxide ink at UNSW includes:**

1. Fabrication of **over 100** battery cells by coating the graphene oxide ink onto glass.
2. Self-charging time using water vapour in the air of approximately **3 mins**.
3. Extremely thin battery cells at around **10-20 microns.** Thinner than a human hair.
4. Small size of 1cm with potential to be made **much smaller.**
5. Generation of more than **0.7 Volts** of power a cell. **3.7 Volt**s goal from connected cells in 12 weeks.



[1] https://www.marketsandmarkets.com/Market-Reports/battery-iot-market-153084557.html

Development of the Battery Ink at UNSW in the next 12 weeks is focused on:

a. **Materials engineering and optimization of ink formulation**
b. **Achieving scale up to large batch size of Battery Ink of at least 1 litre**
c. **Successful prototype connecting multiple battery cells producing at least 3.7 Volts.**

Further development challenges include reducing Battery cell size whilst increasing current output at lower humidity levels and demonstrator device development.

Batteries for Internet of Things (IOT)

Technological advancements and adoption of various IOT devices such as wearables, smart meters, various sensors and home automation products, are key reasons for driving growth in the battery market. The global **battery market** for IOT is already significant with **USD 8.7 billion in 2019 and is projected** to grow to **USD 15.9 billion by 2025**[1]. The growing need for thin and flexible batteries in IOT and medical devices, along with inherent advantages of micro batteries provides significant opportunities.

Collaboration

Development will be conducted under the Australian Research Council part-funded collaboration between the Company, UNSW and CSIRO (announced 30/7/20). The expected outcomes of the Project are 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.

Existing resources from within the Project will be allocated towards integrating the printed Nanocube Memory with printed self-charging batteries. Total budget for the collaborative Project was set as approximately $1,069,000 (up to three years). The Australian Research Council Linkage funding provides $320,000 in cash. Subsidiary 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. UNSW is providing $414,000 in-kind support and services. IP and commercialisation rights remain with the Company. The Company has also opted to increase cash support by $30,000.

Strategic Elements Background

- Investors in SOR potentially **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 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.
- 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

Nanocube Memory Ink Technology Background

- 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.
- 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).
- The Nanocube Memory 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'.
- Please see a video on a demonstrator here https://vimeo.com/386335109/5a8d162249.

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