STRATEGIC ELEMENTS

Self–Charging Battery Ink

Presentation
December 2020
ASX: SOR

aam

Revolutionary Electronic Ink Technologies

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Backing Australian Innovation

- ASX listed Strategic Elements (ASX:SOR) operates under the Australian Federal Government Pooled Development Fund Program. The program provides SOR shareholders with significant tax concessions in order to stimulate investment into Australian innovation[1]

- SOR generates high risk- high reward ventures and projects from combining teams of leading scientist and innovators.

- 100% owned Australian Advanced Materials is a materials company established to identify and commercialise **revolutionary functional materials**

- AAM is developing a **printable memory ink** to disrupt the multibillion dollar Printed and Flexible electronics markets[2]

- AAM has begun development of a revolutionary **flexible self-charging battery ink** initially targeting the multibillion dollar IOT battery market opportunity[3]

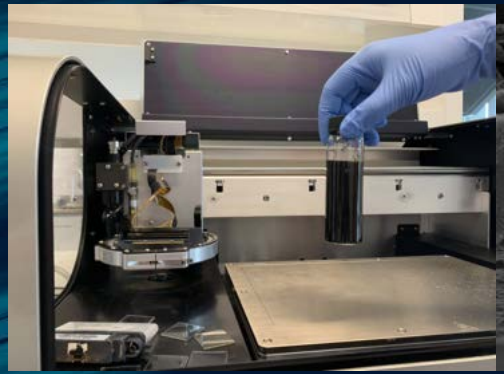
[1] *Shareholders should seek their own independent tax advice* [2] *https://bit.ly/36ScVOb* [3] *https://bit.ly/2HZmdym*

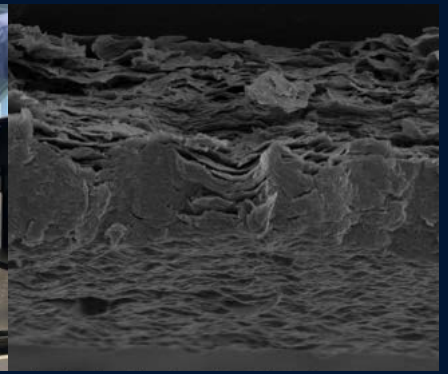
The Technology

- The battery ink technology is based on graphene oxide, a **cheaper and more readily available** graphene derivative
- The battery cells are able to **harvest energy from humidity in the air or skin surface** to self-charge within minutes
- The **self-charging battery** is being developed in collaboration with the University of New South Wales and CSIRO under the Australian Research Council Linkage program
- UNSW has fabricated over **100 battery cells** that self-charge in approximately 3 minutes using water vapour in the air
- UNSW has recently **successfully scaled up production** of the battery ink, increasing ink production capacity by tenfold from 200 to 2000 battery cells
- This major milestone was achieved **very rapidly and early** in the development process due to the intellectual property gained during the development of the Company's Nanocube Memory Ink

Technology Highlights

- Battery ink cells **create electricity from humidity** (65-85%) in the air or skin surface to self-charge themselves within minutes
- **Self-charging** feature removes the need for manual charging or wires for power
- Early testing shows a single battery cell can generate **0.8 Volts** for over 2 hours with no sign of degradation. Development is continuing





- Battery cells are extremely **thin and light**. Lighter than a single rain drop and thinner than a human hair
- The technology is being developed to be incorporated into devices where flexibility is needed
- Battery cells are **non-flammable and non-toxic** creating potential for them to be used in electronic skin patches
- Further development is being conducted to optimise and test multiple features of the battery ink technology

Federal Government Funding

- The Battery Ink is being developed under collaboration with the University of New South Wales and CSIRO partially funded by the Australian Research Council Linkage program
- The collaboration is developing new electronic materials for a wide range of uses in flexible electronics and significant advances in energy efficient data storage devices. These can include memory, all types of sensors, batteries and other flexible electronics
- The team has access to state of the art facilities, including the Australian National Fabrication Facility Node, Australian Synchrotron and Pawsey Supercomputer Centre.
- All intellectual property and commercialisation rights remain with the Company.

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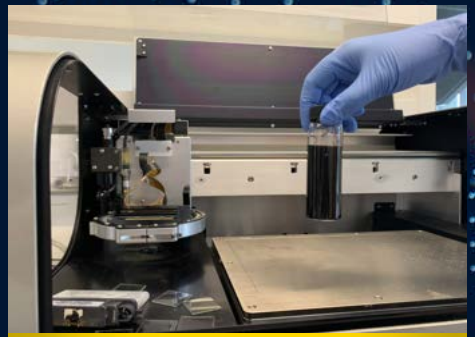
CSIRO

Australian Government
Australian Research Council

World Class Development Partner

- UNSW School of Materials Science and Engineering is ranked #1 in Australia for material science. The group has attracted over $20M AUD in research funding
- UNSW have a number of partnerships and collaborate with leading companies such as Boral, Hitachi Chemical, One Steel and many more
- The Material Science and Research group at UNSW has world-class infrastructure and equipment geared towards advanced materials engineering and fabrication
- The team at UNSW are also behind the invention of the Printable Nanocube Memory Ink, which is recognised as one of the leading developments in printed electronics
- UNSW is a key development partner to enable the Company to fast track the development of the battery ink technology



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Graphene Oxide VS Graphene

One of the key advantages of the Battery Ink technology is that it is based on a **graphene derivative** called graphene oxide (GO), which is more available, cheaper and easier to manufacture than graphene due to superior dispersity. **GO based technologies** therefore have the potential to enter production sooner.

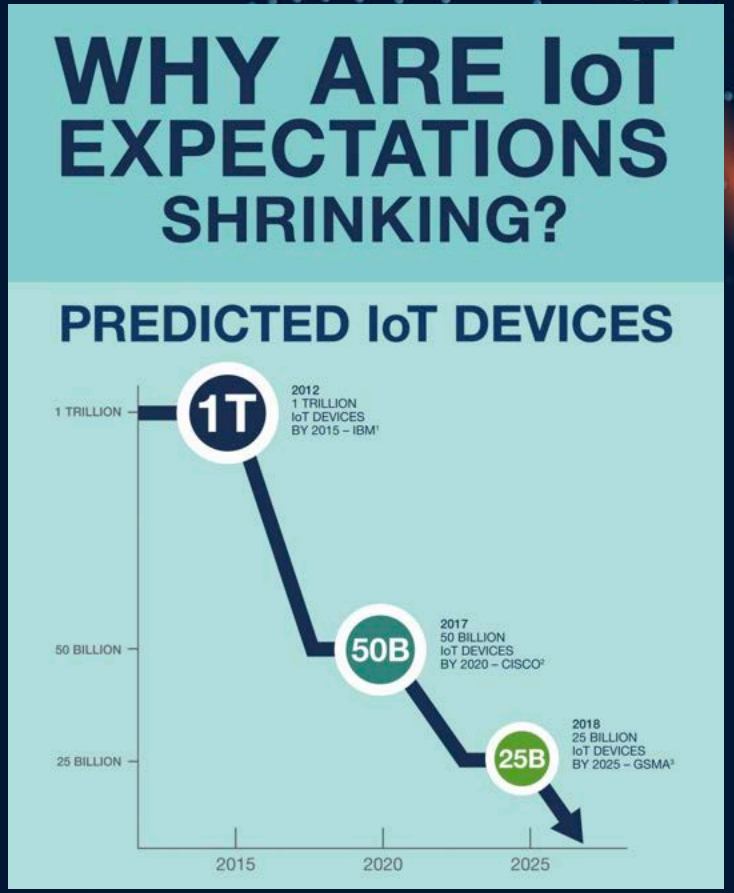
	Battery Ink (Graphene Oxide)	Graphene
Cost	Low	Very high
Dispersity	Can be easily dispersed in water or solvents. Ideal for printing	Difficult to disperse in water or solvents
Manufacturing	Solution processed systems (i.e printing)	Requires expensive fabrication facilities
Stability	Stable in ambient temperature and humidity	Sensitive to ambient temperature and humidity
Electrical/Physical Properties	Can be easily controlled and tuned through materials engineering	Difficult to control and alter properties

Cost to manufacture graphene is $100 USD per gram, that equates to $100 Million USD per tonne!

IOT Battery Market

- The IOT battery market is surging due to the **multi-fold rise** in the adoption of IOT-enabled devices across different sectors from industrial to healthcare. There are 127 new IOT-devices being connected **every second**[1]!
- However batteries used for IOT sensors require **replacement** when they run out of power and are disposed to landfills. The market is actually being held back by batteries.
- The IOT battery market today is worth USD$9.2 billion and expected to reach **USD $15.9 billion by 2025**[2]

Batteries are currently one of the biggest hurdles for IoT



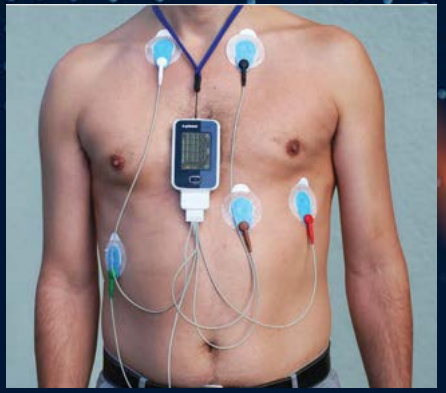
https://bit.ly/3qCk9NZ

1. https://bit.ly/37ne7lj
2. https://bit.ly/2HZmdym

Electronic Skin Patch Market

- The electronic skin patch market is a **multi billion dollar market**, recording USD$ 10 billion in revenue in 2019 and forecasted to grow to nearly USD$40 billion by 2030[1]

- Skin patches are **wearable products** that have integrated electronic components such as sensors and communication components attached to the surface of the skin to relay vital information about the human body, these may include cosmetic, strain, diabetes and cardiovascular monitoring



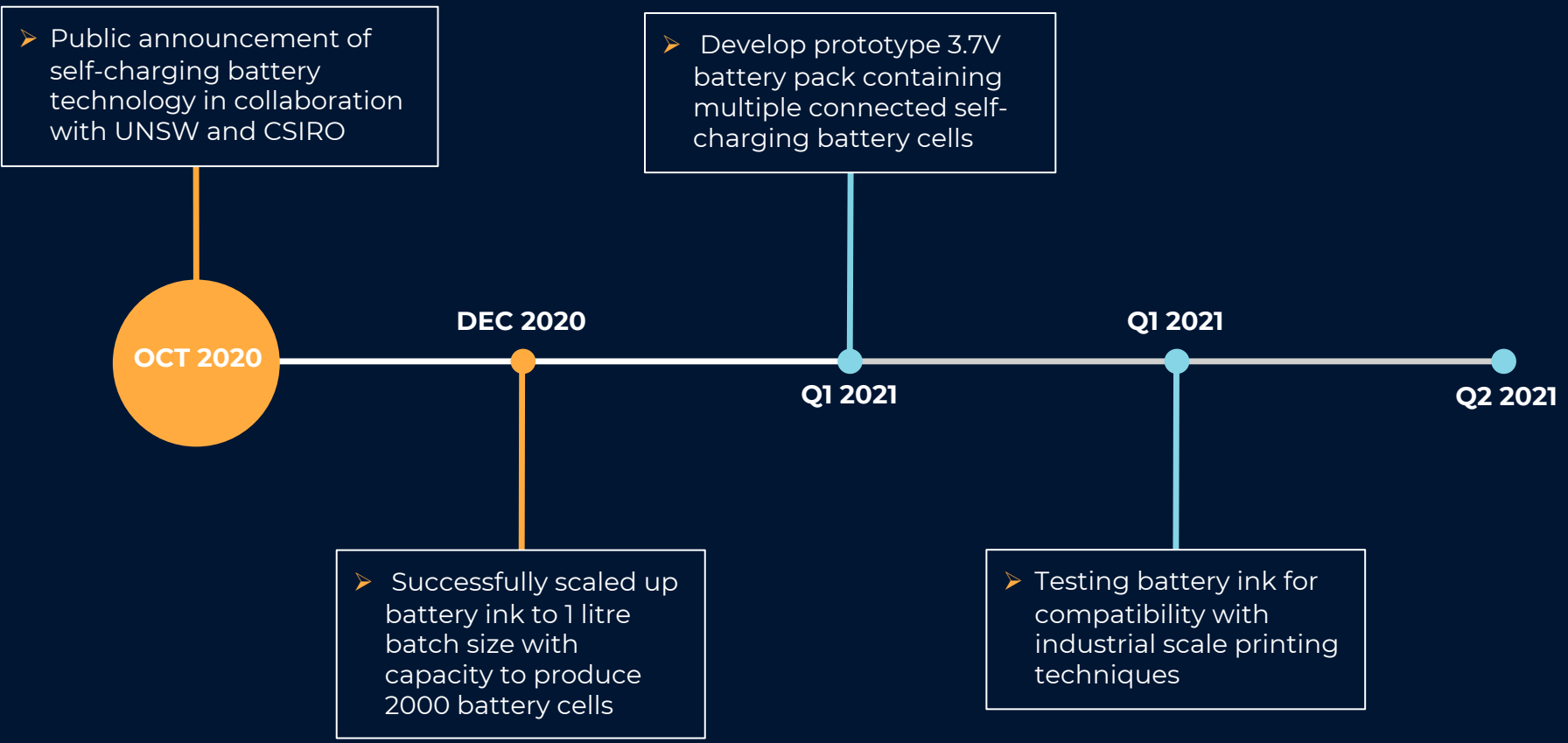
- Current solutions are still relatively **bulky and require manual charging** or replacement of battery cells

- The **human skin** is known to generate elevated levels of humidity up to 90%. AAM's battery cells successfully generated 0.8 Volts in 65-85% humidity for two hours with **no sign of degradation**

- **Battery Ink** cells have strong potential to provide a flexible, light, self-recharging power source for electronic skin patches

1. https://bit.ly/3lq4XQr

Near Term - Battery Ink Development



Summary

- The battery ink technology has achieved a major milestone with the successful scale up of the battery ink to 1 litre batch size capable of producing 2000 battery cells
- The Company is aiming to develop a world first 3.7 Volt battery pack prototype containing multiple connected self-charging battery cells
- AAM will continue to refine, test and improve on the scaled up ink, including testing for industrial scale printing techniques and lower humidity operation levels

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