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Gelion plc

Gelion Next Generation Lithium-Sulfur Battery development update

Gelion (AIM: GELN), the Anglo-Australian battery innovator, announces an update on its Next Generation Lithium-Sulfur (Li-S) battery development.

Gelion is pleased to announce that the recent test results display early validation of the primary elements of Gelion's technology plan, building on our acquisition of a leading Li-S IP portfolio from Johnson Matthey, acquisition of OXLiD, and the JDA with IonBlox in 2023.

- 1. Performance of OXIS GEN2 technology acquired from Johnson Matthey has been replicated and validated:
 - Gelion has benchmarked OXIS GEN2 cell technology (acquired from Johnson Matthey in March 2023) and produced 1.0Ah pouch cells that achieved 245 Wh/kg in testing. Independent modelling from the 1.0Ah cells predicts that 5Ah cells currently being prepared for fabrication can be expected to achieve approximately 400 Wh/kg, in-line with OXIS Energy's results. High Wh/kg translates to lighter batteries and opens many advantages for transport applications including e-aviation and Electric Vehicles (EVs).
- Gelion's Next Generation (beyond GEN2) technology (combined OXIS/OXLiD/Gelion Technologies) pouch cell testing successfully implemented, displaying superior solid-to-solid Sulfur behavior:
 - Gelion has produced 0.5Ah pouch cells (lithium-metal anode) with its cathode and electrolyte. These cells confirm that the solid-to-solid behaviour developed in coin cells successfully transfers to larger cell formats.
- 3. Gelion's testing of IonBlox SiOx anode with Gelion Next Generation Cathode and Electrolyte is demonstrating expected capacity and indicate stable cycling. The specific capacities being achieved are substantially higher than achievable with common NMC (nickel, manganese, cobalt) cathodes. Gelion anticipates that its metal-free cathode, based on abundant sulfur, will result in a cheaper, more stable and safer battery.

Gelion's ambition for its Next Generation platform is to unlock the potential of sulfur batteries for a wide range of global applications including electrical vertical-takeoff-and-landing (eVTOL), drone markets, EV, and stationary energy storage (ESS). Sulfur being an abundant material offers a future not limited by geographically concentrated and controlled battery metals.

John Wood, CEO of Gelion said "Strong recognition is emerging of the anticipated importance of Li-S technology in the energy transition and the expected commercial scale of the market. Our strategic plan towards LiS has been to develop or acquire strong intellectual property and know-how with the goal of establishing leadership at the right time. I am delighted that our initial results are in-line with or exceeding our predictions for that plan. Li-S aims to double the typical gravimetric energy density of current Lithium-Ion batteries (halve the weight) opening applications where weight and safety are the primary requirements. Gelion is following a unique approach that combines the use of inexpensive materials with low-cost processing. We believe this to be an important technological contribution that will be a strong base from which to build commercial success.

"The potential of Li-S has long been known but achieving the performance benefits of Li-S batteries is not simple. Gelion has uniquely assembled the team of experts and the IP to allow us to crack the technical challenges. Our results indicate that our pathway is on track."



Gelion has ensured next-gen leadership before scaling up



Background

In May 2023, Gelion updated on the progress made using the battery technology package acquired from Johnson Matthey (containing, in addition to its own IP, the Li-S IP and know-how from OXIS Energy). Gelion has worked over the past nine months to benchmark, improve on, and define a next-generation approach to Li-S battery development.

Li-S batteries are an advanced alternative to Li-ion batteries that can achieve much greater gravimetric energy densities (measured as amount of energy per battery weight). This is critical to drive down the weight in mobile applications such as airplanes, drones and electric vehicles, reducing auxiliary component cost and lessening their upfront environmental impact. They do not contain rare metals in the cathode and can be scaled to meet the demands of global electrification. The technology shows promise to be safer (lower risk of fires) than current batteries.

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About Gelion

Gelion ("gel: ion") is a global -energy storage innovator, supporting the transition to a more sustainable economy by commercialising two globally important next generation technologies: Lithium-Sulfur (Li-S) and Zinc-based (Zn) hybrid cells to electrify mobile and stationary applications. Gelion plc (the Group) is listed on the London Stock Exchange's AIM market and wholly owns Australia based Gelion Technologies Pty Ltd. Gelion is designing and delivering innovative battery technology to enable that transition and return value for its customers and investors.

Lithium Sulfur

Gelion's effort is directed at the potential for the Li-S chemistry to deliver double the gravimetric energy density of standard Lithium-ion chemistries whilst concurrently reducing cost and increasing safety, targeting the EV and e-aviation market, helping to make global transport, energy consumption and storage more sustainable.

Gelion is developing a product for its high energy density sulfur cathode at its expanded R&D facilities in Sydney, enabling it to integrate with a variety of anodes ranging from graphite to silicon to lithium metal, depending on the targeted application.

Gelion recently also expanded in the UK by acquiring OXLiD Ltd, significantly increasing its capability in cathode improvement thereby accelerating path to commercial partners and commercialisation.

Zinc

Gelion is adapting its zinc technology to comprise an alternate cathode technology, a zinc hybrid cell to develop complementary next-generation batteries for the lead-acid eco-system. Early testing indicates that this solution has the potential to maintain good energy density levels with enhanced cost and safety aspects. Once fully developed, Gelion intends for its zinc technology to provide a durable and sustainable market extension within the ecosystem that supports lead-acid batteries.

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