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**Gelion plc**
("Gelion", "Company" or the "Group")

**Gelion's GEN 3 Sulfur Cathodes Viable for Full Solid-State Batteries**

Gelion (AIM: GELN), the Anglo-Australian battery innovator, updates on relevant progress made in its Gen 3 Sulfur Cathode Technology, which has been in development to unlock the potential of sulfur batteries for a range of global energy storage applications.

Following testing by an independent third party, a renowned European research institution, the Group has now demonstrated that its proprietary Gen 3 Sulfur Cathode material is viable to be paired with solid-state electrolyte material toward full solid-state applications. This development means Gelion has a technology with the potential to complement and establish a significant market presence alongside traditional Li-ion cathode chemistries (e.g. NMC or LFP).

Pairing the cathode material with solid-state components is expected to be a critical factor in:

- Preventing polysulfide shuttle - a route to improving battery longevity
- Eliminating liquid electrolyte - no leakage, lower flammability risks, and a route to better safety
- Offering a route to higher energy density - enabling lighter batteries
- Presenting an opportunity to apply low-cost and sustainable sulfur cathodes to solid-state approaches

The Gelion Sulfur Cathode material is identical to that used with its high-performance Gen 3 liquid electrolyte lithium-sulfur batteries, which have already achieved high energy density of 402 Wh/kg. This development allows Gelion to potentially offer a solution across the liquid, semi-solid-state and solid-state technologies, targeting an even wider range of applications. Gelion's Sulfur Cathode technology is compatible with multiple anode chemistries and has made significant progress over the last 12 months to extend its applicability and potentially remove barriers for commercialisation.

Gelion is at the forefront of developing low-cost sulfur cathodes that can be broadly applied across various Li battery chemistries and applications, including electric vehicles, stationary storage, and drones, where reliability, weight reduction and cost savings are required. Sulfur offers significant advantages, including high energy density, cost-effectiveness, abundance and sustainability.

Solid-state batteries have the potential to revolutionise energy storage by enhancing safety, increasing energy capacity, and reducing reliance on critical raw materials. Despite their benefits, solid-state batteries require high capital investment for development of manufacturing capability, scalability, and to overcome material constraints.

Gelion has adopted a Materials Business model and plans to focus on the manufacturing scale-up of its Gen 3 cathode material. It intends to do so by partnering with companies with existing expertise in the design and production of full-solid-state cells to distribute its Gen 3 cathode technology for long term applications requiring high energy and low-cost batteries. This will be undertaken whilst continuing to optimise the GEN 3 cathode technology in liquid electrolyte-based silicon and semi-solid-state battery technologies with greater potential to electrify shorter term markets in Aerospace, Defence and niche Automotive applications.

This development directly ties into the Group's mission to provide global energy storage solutions that are robust, safe and affordable with low environmental impact, enabling the supply of clean power for all.

**John Wood, Gelion CEO commented: "***I am very pleased with the balanced yet ambitious approach our team is taking in advancing our Sulfur Cathode Technology. Sulfur has the potential to be a game changer for battery technology and the energy transition.*

*"A successful energy transition requires two elements: the first is technology that provides a full solution to market needs and the second commercial development of key supply chain relationships.*

*"This progress allows Gelion to confidently demonstrate to our partners that our leading sulfur battery technology will be able to support their own objectives across the full scope as the industry progresses toward liquid, semi-solid-state, and full-solid-state outcomes".*

**Cathode Viability for Full Solid-State Batteries**

Gelion's high energy density GEN 3 Sulfur Cathode material has been successfully tested by an independent third party in a full solid-state configuration, a key step toward unlocking the full potential of lithium-sulfur chemistry potentially opening pathways for a wider range of application.

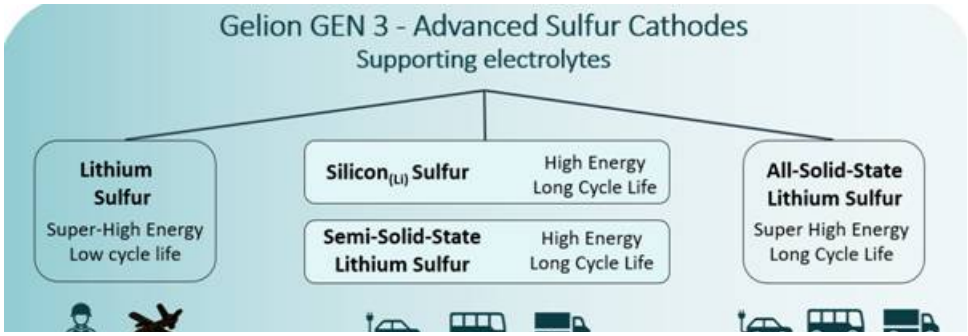


*Figure 1: Battery technologies in which Gelion Gen 3 sulfur cathode technology has the potential to be employed*

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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 (LiS) and Zinc-based (Zn) hybrid cells to electrify mobile and stationary applications. Gelion plc (the Group) is listed on the London Stock Exchange's Alternative Investment Market and wholly owns Australia based Gelion Technologies Pty Ltd and UK based OXLiD Ltd. Gelion is designing and delivering innovative battery technologies and integrated systems solutions 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 GEN 3 Lithium Sulfur cell product for its high energy density sulfur cathode at its expanded R&D facilities in Australia and UK, enabling it to integrate with a variety of anodes ranging from graphite to silicon to lithium metal, depending on the targeted application.

Gelion's GEN 3 cell is unlocking the potential of sulfur batteries for a wide range of global mobile applications including electrical vertical-take-off-and-landing (eVTOL), drone markets, electric vehicles (EVs) and stationary energy storage (ESS).

**Advantages of Gelion's GEN 3 Lithium Sulfur**

- **High energy density -** Energy density > 400 Wh/kg, when using a 10+ Ah pouch cell.
- **Semi-solid-state / Solid-State as a route to increased longevity/cycle life**: GEN 3 employs a semi-solid-state and solid-state mechanism which mitigates the major degradation factor associated with conventional Li-S technology.
- **Increased sulfur utilisation:** GEN 3 demonstrates the full theoretical capacity of sulfur, i.e. a much higher sulfur utilisation than found in conventional Li-S approaches.
- **Simplified supply chain:** The innovative cathode is produced by mixing commercially available materials with abundant sulfur using a low-energy, room-temperature process, with potential to eliminate the need for pre-fabrication of the sulfur composite (sulfur composite is related to cathode active material in conventional lithium-ion batteries), streamlining the associated supply chain and production process and enabling localised manufacturing.
- **Environmental and economic benefits:** The water-based, standard-atmosphere cathode production process eliminates the need for toxic solvents, leading to significant cost savings and enhanced manufacturability.

**Glossary**

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| 1MPa | This level of pressure replicates real-world pressure conditions inside batteries and is crucial for ensuring the durability, efficiency, and performance of the separator in practical applications. |
| Ah | Ampere hours. A measure of capacity stored in the cell. The larger the number the higher the capacity. |
| Energy density (Wh/kg) | The ratio of energy stored per unit weight i.e. Watt-hours per kilogram. The higher the number the lighter the battery. |
| Pouch cell | An industry standard format of a battery which comprises a flat pouch-shaped design with a multi-layered laminate structure. |

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| Solid-to-solid conversion | A low or polysulfide-free conversion of sulfur within the cathode. Polysulfides are a dissolved form of sulfur that is corrosive and reduces cycle life in traditional lithium-sulfur batteries. Solid-to-solid conversion helps mitigate the formation of these polysulfides. |
| Semi-solid state as a route to increased longevity/cycle life: | Gelion's GEN 3 technology can employ a semi-solid-state mechanism, maintaining the sulfur-based cathode materials in the cathode, preventing their diffusion into the electrolyte and diminishing associated battery degradation caused by reactive polysulfides. This approach mitigates the major degradation factor associated with conventional Li-S technology. |
| Solid state separator | A solid-state separator is a solid material that separates the anode and cathode in a battery, enabling ion transfer while preventing short circuits enhancing battery safety, supports higher energy densities, and allows stable use of a lithium metal anode, increasing capacity and lifespan. |
| Cycle life | The number of full charge and discharge cycles a battery can complete before its capacity falls below a specified level, typically 80% of the original capacity. Higher cycle life indicates longer-lasting performance. |

**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 our zinc technology to provide a durable and sustainable market extension within the ecosystem that supports lead-acid batteries.

**Recycling**

Gelion is pioneering an innovative battery recycling technology designed to enhance and supplement current recycling methods. Our technology aims to significantly reduce the initial costs of recycling plants, minimize waste, and lower carbon emissions, while improving the purity of metal products and enabling efficient lithium extraction. This advancement will allow for a broader range of scrap materials to be recycled. Currently in the feasibility stage, Gelion is committed to advancing our technology to a pilot-scale demonstration, paving the way for commercialisation through material production and IP licensing.

**Integration**

Gelion leverages its significant integration and BMS capability to deliver bespoke BESS for Australian customers. These BESS are currently based on lithium-ion technology and will also include Gelion's next-generation batteries as these become available. Gelion will deploy BESS with our proprietary cloud-based battery monitoring system, which will provide real-time diagnostics and alerts to maximise performance and return on investment for our customers.



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