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

### GEN 3 Lithium-Sulfur Battery Development Update

*Advancements towards unlocking the potential of sulfur batteries for a wider range of global applications*

Gelion (AIM: GELN), the Anglo-Australian battery innovator, announces an update on its Next Generation ("GEN 3") Lithium-Sulfur (Li-S) battery development.

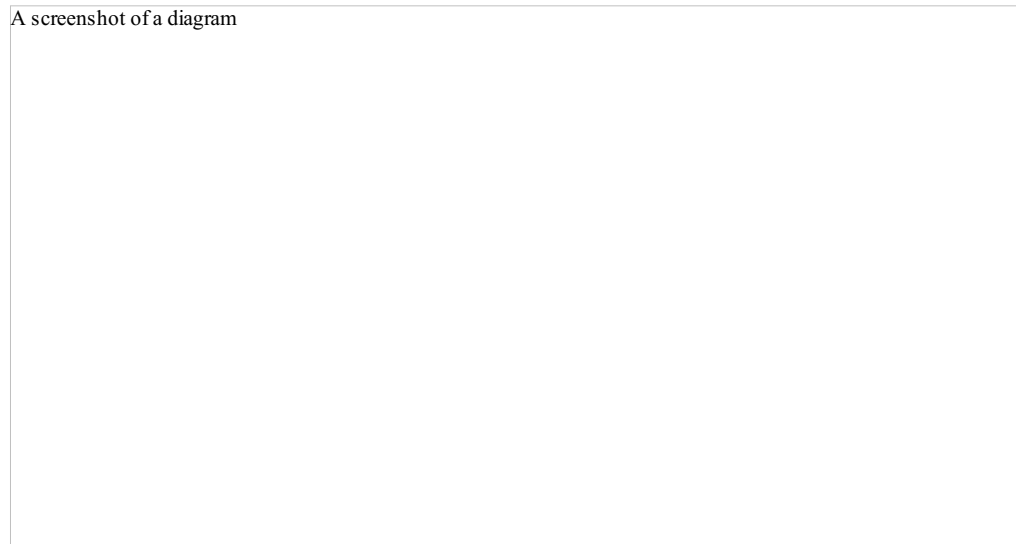
Building on the announcements made in March and April 2024, Gelion has now successfully developed 1 Ah semi-solid-state Li-S pouch cells with its GEN 3 cell technology. The Company's modelling from these 1 Ah GEN 3 cells predicts that a 10 Ah cell can be expected to deliver energy density greater than 400 Wh/kg.

Gelion's GEN 3 technology uses a unique sulfur cathode material (fabricated using a unique, low energy process carried out at room temperature), water-based cathode processing (non-toxic), and a proprietary liquid electrolyte. The GEN 3 platform is based on a specially engineered formulation of commercially available materials in combination with abundant sulfur to demonstrate high energy density and operational temperature capability.

**John Wood, CEO of Gelion commented on the development** *"Gelion has assembled a formidable technology base and team to progress its development program towards unlocking the full potential of this important cell chemistry. As an evolution of GEN 2, the GEN 3 cell not only retains the high energy density of its predecessor but also offers enhanced functionality. It is designed to surpass the GEN 2 cell in both performance and manufacturability, paving the way for scalable production."*

### Gelion's LiS Technology Development Pathway

A screenshot of a diagram



### Benefits of Gelion's GEN 3 over GEN 2

- **Higher energy density** - Energy density expected to be greater than 400 Wh/kg, when using a 10 Ah pouch cell.
- **Increased longevity/cycle life**: GEN 3 employs new sulfur chemistry to increase stability, addressing the major degradation factors 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 combines specially engineered, but commercially available, materials with abundant sulfur that are produced using a low-energy, room-temperature process, eliminating the need for pre-processing, streamlining the battery production process and enabling localised manufacturing.
- **Environmental and economic benefits**: The water-based, atmospheric cathode production process eliminates the need for toxic solvents, leading to significant cost savings and enhanced manufacturability.

GEN 3 uses the extensive network of Li-S technologies developed within Gelion and contained in the patents acquired from Johnson Matthey in March 2023.

### Addressing the key barriers to commercialisation

The GEN 3 semi-solid-state Li-S cell builds on the GEN 2 Li-S cell (developed by OXIS Energy) and addresses the key barriers to commercialisation faced by typical lithium-sulfur developers.

Sulfur, being an abundant material, offers a future not limited by geographically concentrated and controlled battery metals. However, other lithium-sulfur developers often require the use of hard to obtain, rare or costly materials and have to rely on high-energy and time-consuming processes. Gelion's GEN 3 platform and production process circumvents these barriers.

The GEN 3 cell is designed to tolerate higher operational temperatures by using Gelion's proprietary 'SulfurLock electrolyte' - which is free from temperature-sensitive additives typically found in Li-S batteries. Additionally, this electrolyte has been engineered to prevent sulfur redistribution during operation, increasing cycle life, addressing the primary cause of degradation in Li-S batteries.

Gelion's cathode uses a proprietary sulfur active cathode material, fabricated using a unique, low energy process performed at room temperature. By using this process, Gelion can eliminate the need to pre-fabricate the cathode-active material. This has the potential to simplify the battery supply chain and make the production of sulfur batteries not only easier, but also more cost efficient than is the case for lithium-ion batteries, enhancing the manufacturing options geographically.

A diagram of a company Description automatically generated with medium confidence

The cathode utilised in this new cell design is fabricated using a water-based process and standard atmospheric conditions. Compared with current battery production, this will enable replacement of toxic solvents and produce large electricity and cost savings for cathode production.

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

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### Glossary

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.
Solid-to-solid	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

conversion	traditional lithium-sulfur batteries. Solid-to-solid conversion helps mitigate the formation of these polysulfides.
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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 and thereby accelerating a 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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