



Novel sodium ion rechargeable batteries for stationary and mobile applications

What are rechargeable batteries?

Rechargeable batteries (also known as secondary cells) are batteries that potentially consist of reversible cell reactions that allow them to recharge, or regain their cell potential, through the work done by passing currents of electricity. As opposed to primary cells (not reversible), rechargeable batteries can charge and discharge numerous times.

Types of rechargeable batteries

1. Lead-Acid Batteries
2. Nickel-Cadmium (NiCd) Batteries
3. Nickel-Metal Hydride (NiMH) Batteries
4. Lithium-Ion (Li-ion) Batteries

Drawbacks of existing rechargeable batteries

1. Lead-Acid Batteries: Unfortunately, they contain lead, a notorious toxin. This being the case, they are very bad for the planet if not properly disposed of. They must be taken to a recycling centre that accepts them and never simply thrown out.
2. Nickel-Cadmium (NiCd) Batteries: They have a very low capacity. Cadmium is toxic.
3. Nickel-Metal Hydride (NiMH) Batteries: They quickly lose energy when not in use. Lifespan is shorter as compared to other batteries.
4. Lithium-Ion (Li-ion) Batteries: They contain a flammable electrolyte, they do pose a potential danger. For this reason, Li-ion batteries require a safety circuit.

Spin-out of technology for novel rechargeable batteries: [Rechargion Energy Pvt Ltd](#)



[Scientists at CSIR-National Chemical Laboratory](#) have developed a laboratory-scale prototype rechargeable battery with indigenous technology based on patented hard carbon material and sodium compounds. [Rechargion](#), the spin-out is an innovative deeptech startup developing sustainable, affordable and green energy storage solutions and is dedicated to developing advanced technology related to sodium ion and lithium sulfur rechargeable batteries for stationary and mobile applications. They are currently working on research, development and manufacture of next generation sodium-ion batteries. The company is also developing Lithium-Sulphur batteries which have a potential for 3-5 fold improved energy density over Li-ion technologies at an acceptable weight.

Impact created by Rechargion

Rechargion Energy has developed a safer, sustainable and commercially viable alternative to lithium batteries to push forward India's electric mobility initiative. Rechargion provides safer and sustainable energy storage solutions based on sodium-ion chemistry as an alternative to Li-ion rechargeable batteries.

Sodium offers tremendous potential due to its ubiquitous high abundance and cost-effectiveness. Therefore, it is possible to mitigate the issues of scarcity, import dependence, cost, and demand-supply ratio associated with lithium, nickel, and cobalt which all require resource-intensive mining.

Rechargion's proprietary hard carbon anode and symmetrical Al-Al current collector structure exhibit excellent energy storage performance. Advantages over Li-ion include zero-voltage storage/transportation, faster charging, wider temperature range, better thermal stability as well as improved storage capacity, and better cyclability.

'Self-Reliance' for energy needs is rapidly becoming essential for many countries. A domestic supply chain for all raw materials amalgamated with our end-to-end battery cell manufacturing make our Na-ion technology ideal for India, which is capable of being replicated worldwide.

The license has helped the spinout to raise funding of more than a million dollars to further advance the technology to the market.

TechEx.in- Technology Transfer Office and its role



TechEx.in is a regional technology transfer office based in western part of India. It aims to help technology developers and technology commercialisation entities find each other, forge partnerships and advance the technology closer to the market in a win-win partnership.

TechEx played a crucial role in the spin-out creation process by conceptualizing and implementing Express License Agreements that helped expedite decision-making and actions. TechEx.in's efforts enabled Rechargion to focus on its core competencies, while providing administrative and legal support to streamline the spin-out

Step towards achieving National Mission: Transformative Mobility and Battery Storage

[The National Mission on Transformative Mobility and Battery Storage](#) will contribute to the energy mission of the nation and help to drive clean, connected, shared, sustainable and holistic mobility initiatives.

The Mission will develop strategies for transformative mobility and Phased Manufacturing Programme (PMP) for EVs, EV components and batteries. PMP will focus on Battery, raw materials, electrochemistry, end of life treatment, cell manufacturing, modules, battery packs. PMP would support setting up of large-scale, export-competitive integrated batteries and cell-manufacturing Giga plants in India, as well as localize production across the entire EV value chain.

Awards received by Rechargion:

- 1) Rechargion is one of the winners for Ignition Grant for 'Technology-based Energy Solutions: Innovation for Net Zero' under US-India Science & Technology Endowment Fund, 27 Feb 2023
- 2) Winners of "Tectonic — Innovations in Clean Energy by Social Alpha-Atal Incubation Centre (SA- AIC).
- 3) Winner of Technovuus Uptech program organized by ARAI Ministry of Heavy industries. Technovuus created under this policy:
<https://heavyindustries.gov.in/sites/default/files/2023-07/Capital-Goods-Policy-Fin al.pdf>
- 4) Winner of STEM Impact awards 1 Feb 2024.



Media coverage:

1. <https://www.eetindia.co.in/sodium-ion-batteries-offer-sustainable-energy-solutions/>
2. Times of India:
https://www.rechargion.com/files/ugd/843dec_b00fb040a92747e2ab2f8e992769b986.pdf

References:

- 1) <https://chem.libretexts.org/>
- 2) <https://www.novaregion.org/792/Rechargeable-Batteries>