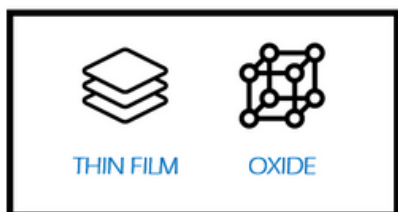


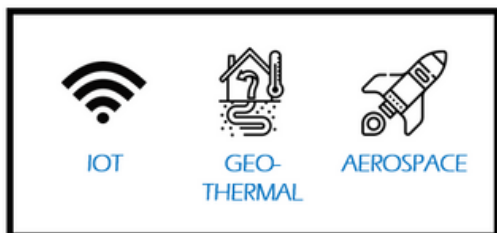
# HIGH-TEMPERATURE OXYGEN ION BATTERY

ENERGY STORAGE DEVICE FOR HARSH ENVIRONMENTS

## THE CONCEPT



MICRO-BATTERY



## PRODUCT DESCRIPTION

- Solution for **energy storage** having high energy and power density
- **Rechargeable** battery based on oxygen ions
- Made of **oxide ceramic materials**
- Uses more **abundant chemical elements**, the device is lithium-free
- Working temperature is 150-400 °C

## APPLICATIONS

- Industrial IoT
- Geothermal
- Aerospace

## ADDED VALUE

- Battery operation at high temperatures
- Tailored design

## TRL

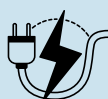
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## DESIRED PARTNERS

- System integrators
- End-users

## EXPECTED BENEFITS



Fast charge-discharge



Higher stability and safety



High-temperature operation



Can be miniaturized

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technical details

## INNOVATION SOLUTION

Lithium-ion (Li-ion) batteries are the most popular battery option available today. Representing more than 90% of the global grid market, they are used in plenty of fields and applications. However, limitations such as current lithium shortages, limited range of operating temperatures, degradation over time and environmental hazards associated to its extraction and end-of-life are drivers that encourage the development of other battery systems based on other materials.

In particular, Li-ion batteries are not suitable for high-temperature applications due to capacity fading (70% capacity loss at 60 °C) and safety issues. The high-temperature oxygen ion battery represents a game-changer for the field of portable batteries, as it can operate continuously in a range of temperatures between 150 °C and 400 °C, without the need for cooling systems. Based on an **all-solid-state architecture**, the technology can be adapted in size and capacity for a number of applications, from harsh industrial setting to geothermal and aerospace.

## KEY ELEMENTS

This technology is a rechargeable battery based on oxygen ions. Oxygen ions are accumulated and exchanged between two electrode layers which are separated by a solid electrolyte. The two electrode layers and the electrolyte are made of oxide ceramic materials that are stacked on top of each other. Thin film deposition techniques may be used for the fabrication of the battery. The operational temperature is 150°C - 400°C, with a voltage up to 1 V and high stability in harsh environments.

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