

TECH OFFER

Safe and Rechargeable Water-Based Battery



KEY INFORMATION

TECHNOLOGY CATEGORY:

Sustainability - Low Carbon Economy

Energy - Battery & SuperCapacitor

TECHNOLOGY READINESS LEVEL (TRL): **TRL4**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174958**

OVERVIEW

To achieve a net-zero carbon emission goal, energy derived from fossil fuels are replaced with green renewables such as solar, wind, etc. However, these renewable energies are intermittent in nature and therefore requires a reliable energy storage system to store these energies. Today, batteries based on lithium-ion and lead-acid are widely used as the go-to energy storage system. However, there are fire safety concerns for the conventional lithium-ion batteries due to its highly volatile and flammable electrolyte while the acidic electrolyte and carcinogenic lead used in lead-acid posed threat to both human and environmental health. Therefore, there is a need for a new safe and environmentally friendly battery system.

This technology offer is a safe and rechargeable water-based battery using a unique green electrolyte formulation (close to neutral pH). Owing to the widened electrochemical stability window and high ionic conductivity of the proposed electrolyte formulation, it enables superior electrochemical performance of the electrode materials used in the batteries, suited towards large-scale energy storage applications.

TECHNOLOGY FEATURES & SPECIFICATIONS

- Safe technology: No risk of fire or explosion
- Green: Environmentally friendly, non-toxic and non-corrosive materials used
- High performance: High-rate capability with superior cell energy density (50 – 140 Wh/kg, 5000 – 10000 cycles, 80 – 90% cycle efficiency)
- Ease of assembly and maintenance: System can be handled and operated in an ambient environment
- Cheap (\$45/kWh)

POTENTIAL APPLICATIONS

This technology offer is for industries or partners who are interested in energy or battery storage systems. The potential applications include but are not limited to:

- Store clean renewables energies (e.g., solar, wind, etc) from power generation side
- Supply low-cost energy and power energy demand from household/industrial/ commercial/EV charging station
- Provide safe and stable energy system as a backup power for high security building (e.g., data centre, etc)

UNIQUE VALUE PROPOSITION

- Safe (non-flammable system)
- High performance (50 – 140 Wh/kg, 5000 – 10000 cycles, 80 – 90% cycle efficiency)
- Cheap (\$45/kWh)
- Easy assembly and maintenance
- Scalable
- Environmentally friendly (non-toxic and non-corrosive materials)