

Tiamat solution for automotive low-voltage applications



TIAMAT

Dr. Asmae El Mejdoubi
Chief Product Officer

tiamat-energy.com

Contact : asmae.elmejdoubi@tiamat-energy.com



Requirements of Low Voltage Battery Applications

Application Markets

Low voltage batteries operate at 12, 24, or 48 volts for automotive, industrial, and backup power systems.

Safety and Reliability

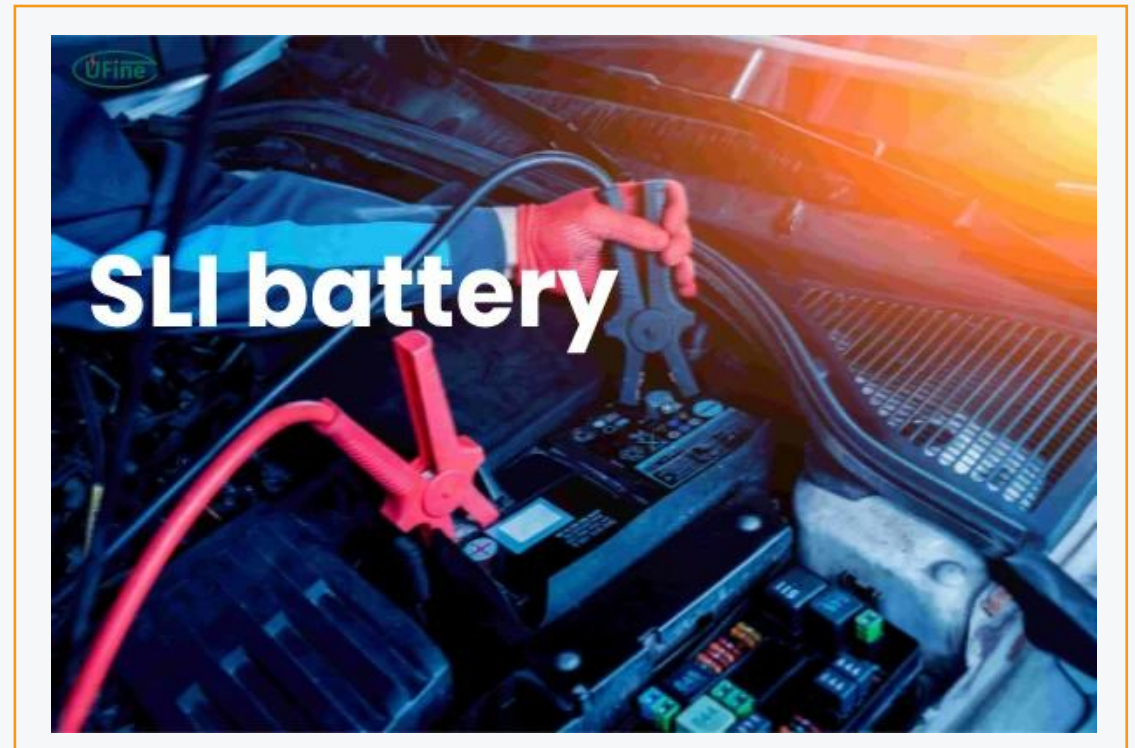
Safety is critical as batteries are integrated near users and electronics, requiring robust failure and thermal safeguards.

Power Capability Needs

High peak currents are essential for engine starts and load transients rather than long-duration energy delivery.

Performance and Cost Priorities

Long lifetime, cost stability, and supply chain resilience outweigh maximum energy density for these applications.



Limitations of Existing Battery Technologies for Low Voltage Use

Lead-Acid Battery Drawbacks

Low energy efficiency, limited cycle life and require regular maintenance.

Lithium-Ion Battery Challenges

Lithium-ion batteries improve efficiency and cycle life but add cost, complexity, and safety management requirements.

Supply Chain and Cost Risks

Lithium supply chains face price volatility and geopolitical risks

Need for Alternative Technologies

Growing low voltage markets require new battery solutions better aligned with application demands and reliability.



Our Solution

From CNRS research, Tiamat's Sodium-ion technology is **lithium, cobalt and nickel free**, eliminating the issues of limited resources

And delivering **exceptional performances**:



High power density



Fast charge



Long lifetime



Extreme Safety



Our chemistry

Tiamat's technology is based on a polyanionic cathode

NVPF ($\text{Na}_3\text{V}_2(\text{PO}_4)_2\text{F}_3$) / Hard Carbon



High voltage cathode



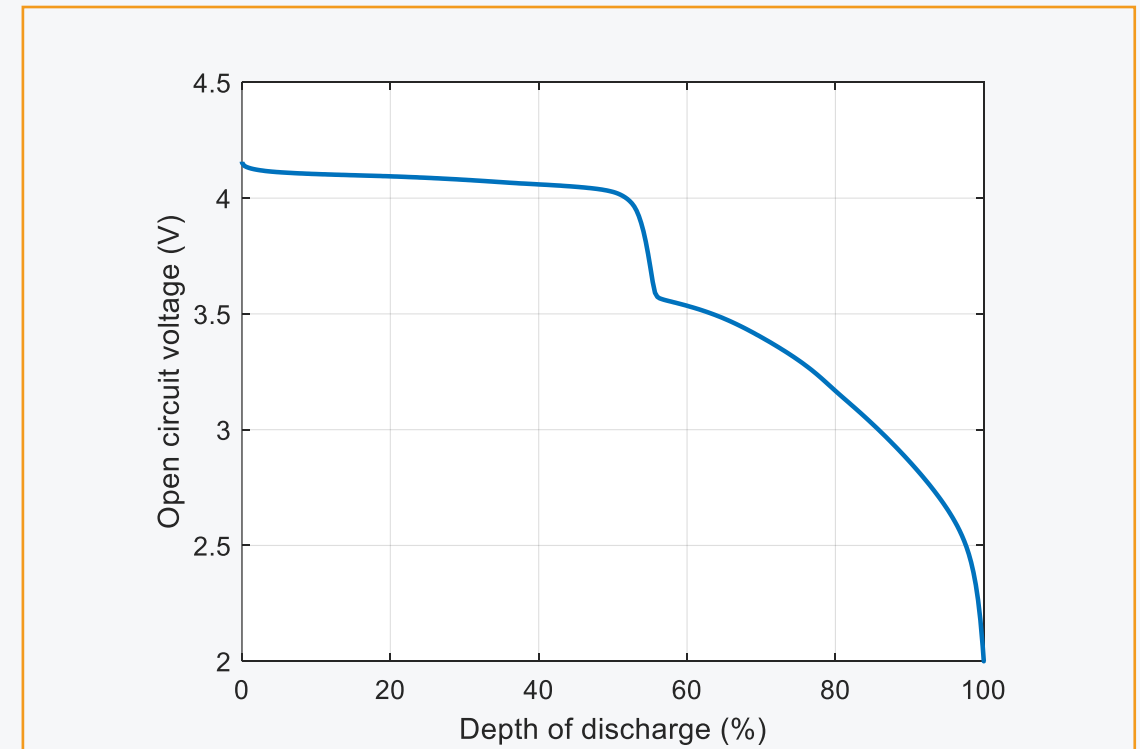
High power capability



Thermal stability



Lower energy density

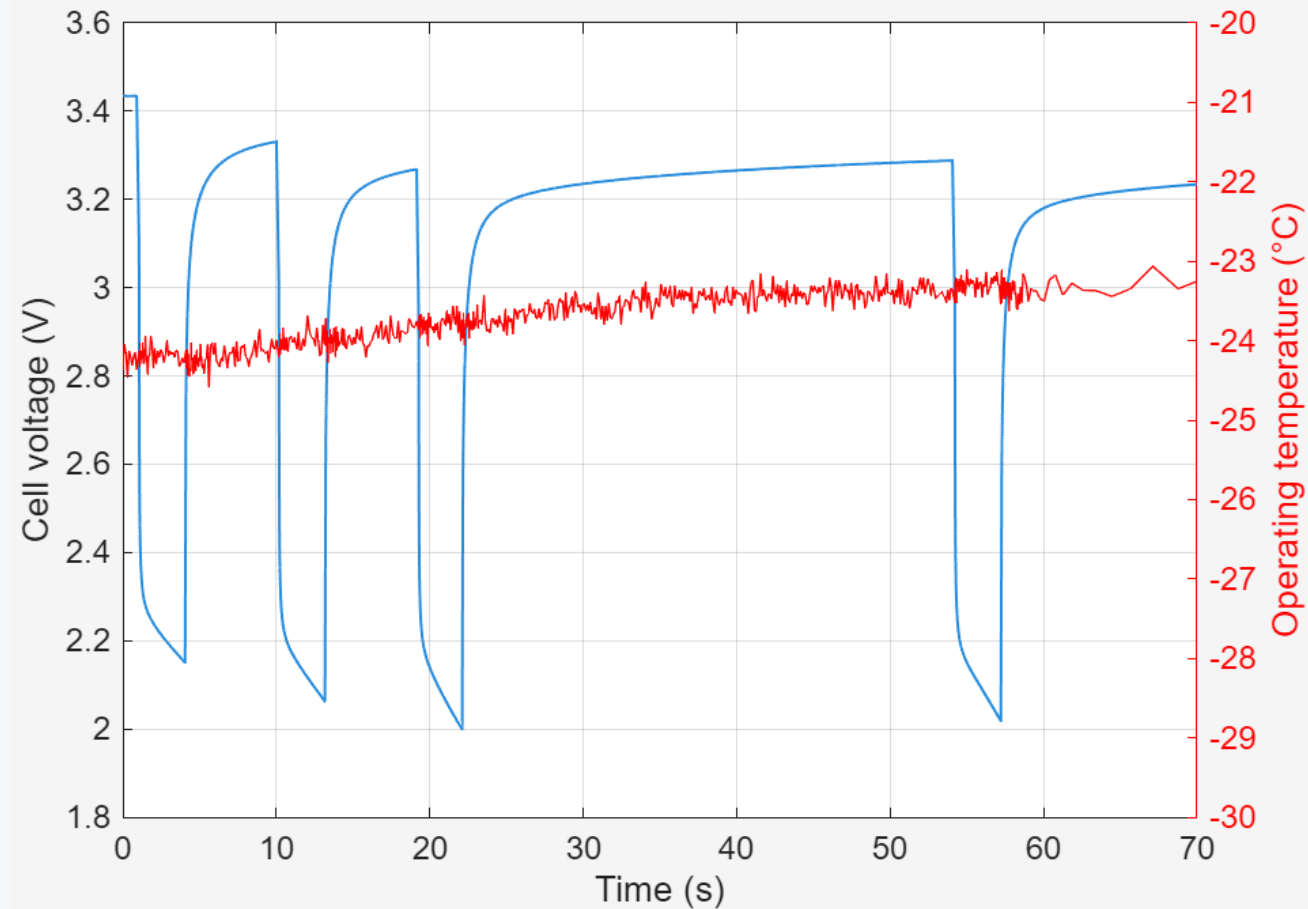


Tiamat Sodium-ion vs Lithium-ion for low voltage

CRITERION	SODIUM-ION (TIAMAT)	LITHIUM-ION (LFP)
Nominal Cell Voltage	2–4.2 V	~3.2 V
Energy Density	105 Wh/kg	150–200 Wh/kg
Power Density	>5 kW/kg	1–3 kW/kg
Fast Charge Capability	20C	1–3C
Cycle Life (80% SoH)	20,000 cycles	2,000–4,000 cycles
Thermal Safety	Very High	Moderate
Critical Materials	None (Sodium)	Lithium
Operating temperature	-40°C to 60°C	-20°C to 55°C

Low voltage applications

Cold cranking results: 5C pulse at -25°C, 30% SOC





TIAMAT

tiamat-energy.com

Contact : asmae.elmejdoubi@tiamat-energy.com