

# An all-solid state nasicon sodium battery operating at 200 c

What is an all-solid state sodium ion battery assembled by SPS?

An all-solid state Na battery assembled by SPS is demonstrated. NASICON-type materials are used as both electrode and electrolyte. The battery operates at 200 °C with high reversibility. An all-solid state symmetric monolithic sodium ion battery operating at 200 °C is described, using NASICON-type electrodes and electrolyte.

What is the reversibility of a sodium ion battery?

The battery operates at 200 °C with high reversibility. An all-solid state symmetric monolithic sodium ion battery operating at 200 °C is described, using NASICON-type electrodes and electrolyte.  $\text{Na}_3\text{V}_2(\text{PO}_4)_3$  is used at both electrodes as the active material while  $\text{Na}_3\text{Zr}_2\text{Si}_2\text{PO}_{12}$  stands the role of the Na<sup>+</sup> solid electrolyte.

Do all-solid-state sodium-ion batteries work at ambient temperature?

All-solid-state sodium-ion batteries that work at ambient temperature are a potential approach for large-scale energy storage systems. Nowadays, ceramic solid electrolytes are gaining attention because of their good ionic conductivity and excellent mechanical and chemical stabilities.

How is NASICON a solid state electrolyte?

The solid-state electrolyte  $\text{Na}_{3.16}\text{Zr}_{1.84}\text{Y}_{0.16}\text{Si}_2\text{PO}_{12}$  was synthesized using a typical solid-state reaction technique. This composition is selected as it is demonstrated that the doping of rare-earth element in NASICON increases its density and reduce the grain-boundary resistance.

What is the principle of a Na ion battery?

The principle of Na-ion batteries is the same as that of Li-ion batteries, since the cathode active material, as a positive electrode, releases electrons into the external circuit during charging, leading to the oxidation of transition metal ions.

Which electrolyte is prepared for all-solid-state sodium-ion battery?

Solid-state electrolyte  $\text{Na}_{3.16}\text{Zr}_{1.84}\text{Y}_{0.16}\text{Si}_2\text{PO}_{12}$  is prepared. Prepared All-solid-state sodium-ion battery works at room temperature. The in situ synchrotron X-ray study shows the bi-phasic reaction of cathode. Sequential Rietveld refinements are analyzed to understand the phase evolution.



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