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Flow battery stack

Overview

A vanadium redox flow battery consists of several basic elements: a flow cell (stack), which are fuel cells wherein an electrochemical reaction occurs; a hydrodynamic system, including pumps, flow sensors and a pressure pump control system; and electrolyte tanks [6].What is a vanadium redox flow battery?

A vanadium redox flow battery consists of several basic elements: a flow cell (stack), which are fuel cells wherein an electrochemical reaction occurs; a hydrodynamic system, including pumps, flow sensors and a pressure pump control system; and electrolyte tanks [6]. Flow batteries require several stacks to achieve the desired performance [7].

Which flow cell design is best for a stack-scale battery?

Serpentine and interdigitated flow fields are the most frequently studied and compared designs. It is found that the overall battery performance heavily depends on the balance between the electrochemical polarizations and pumping work . More significantly, there exist many issues when scaling up the flow cell toward the stack-scale batteries.

Are redox flow batteries a good choice for energy storage?

Among various emerging energy storage technologies, redox flow batteries are particularly promising due to their good safety, scalability, and long cycle life. In order to meet the ever-growing market demand, it is essential to enhance the power density of battery stacks to lower the capital cost.

What is a vanadium flow battery?

Vanadium flow batteries are one of the preferred technologies for large-scale energy storage. At present, the initial investment of vanadium flow batteries is relatively high. Stack is the core component of a vanadium flow battery. The power density determines the cost of the stack.

Are vanadium flow batteries a good choice for large-scale energy storage?

Compared with the current 30kW-level stack, this stack has a volume power density of 130kW/m 3, and the cost is reduced by 40%. Vanadium flow batteries are one of the preferred technologies for large-scale energy storage. At present, the initial investment of vanadium flow batteries is relatively high.

How do redox-flow batteries work?

Energy conversion is carried out in electrochemical cells similar to fuel cells. Most redox-flow batteries have an energy density comparable to that of lead-acid batteries, but a significantly longer lifespan. In the electrochemical cell, electrolyte solutions flow through the half-cell compartments of the plus and minus pole.

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