

# **Liquid flow battery electrode reactions**





## Overview

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Why do redox flow batteries have porous electrodes?

Porous electrodes are critical in determining the power density and energy efficiency of redox flow batteries. These electrodes serve as platforms for mesoscopic flow, microscopic ion diffusion, and interfacial electrochemical reactions.

What is a flow battery?

A flow battery is an electrochemical energy storage system that stores energy in liquid electrolyte solutions. Unlike conventional batteries, which store energy in solid electrodes, flow batteries rely on chemical reactions occurring between the liquids stored in external tanks and circulated through the battery's electrochemical cell.

What is a redox flow battery?

Schematic of a redox flow battery. As a key component of RFBs, electrodes play a crucial role in determining the battery performance and system cost, as the electrodes not only offer electroactive sites for electrochemical reactions but also provide pathways for electron, ion, and mass transport [28, 29].

How do redox-active batteries work?

Fundamentally, they have adopted electrode designs from conventional rigid batteries that rely on the mechanical coupling (solid-to-solid contact) of the redox-active species and the conductive filler (Fig. 1A). A coupled electrode requires a binder to provide mechanical integrity in the solid matrix by holding the respective components together.



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### [Modelling of redox flow battery electrode processes at a ...](#)

Modelling flow, transport, electrical and electrochemical processes within the electrode structure is a developing area of research, and there are significant variations in the model requirements ...

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active ...



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Oct 1, 2024 · Abstract and Figures Electrodes, which offer sites for mass transfer and redox reactions, play a crucial role in determining the energy efficiencies and power densities of ...



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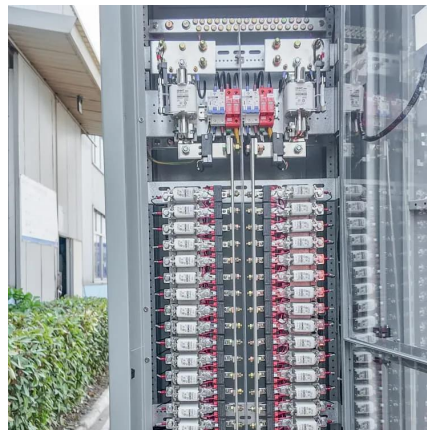






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## How a Flow Battery Works

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## How a Flow Battery Works

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