

Title: Flow battery electrode thickness

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What is the optimal electrode thickness for organic redox flow battery?

A novel numerical model for the organic redox flow battery is built, and this model is verified by the experiments. The results show that the mass transfer and battery performances are influenced by the electrode thickness significantly. Taking the ohmic loss into consideration, the optimal electrode thickness is 1.5 mm.

Does electrode thickness affect battery performance?

The results show that the mass transfer and battery performances are influenced by the electrode thickness significantly. Taking the ohmic loss into consideration, the optimal electrode thickness is 1.5 mm. The rising of electrode channel depth significantly reduces the discharge voltage.

How does the shape of electrodes affect flow batteries?

The influence of the shape of the electrodes on the flow batteries is mainly reflected in the internal polarization and pumping consumption of the battery. The reason for this is that the change of electrode shape can significantly affect the electrolyte distribution, flow rate, and mass transfer correlation.

Which electrode thickness and electrolyte flow rate is optimum power-based efficiency?

Our numerical study suggests that the VRFB with specific electrode thickness and electrolyte flow rate shows optimum power-based efficiency. We concluded that the maximum power-based efficiency of 96.8% was achieved at the electrolyte flow rate of 10 ml/min and electrode thickness of 1 mm.

Abstract The development of vanadium redox flow batteries requires elaborating new materials to improve their performance. To date, the studies of electrode materials for these energy ...

However, the challenges around cost constrain the commercial development of flow batteries. Increasing the power density and energy efficiency of the flow batteries is key to breaking ...

The effect of the electrode thickness on the electrochemical and hydraulic performance of redox flow cells is investigated. Correlations are elucidated between the electrode thickness, ...

This research focuses on the improvement of porosity distribution within the electrode of an all-vanadium redox flow battery (VRFB) and on optimizing novel cell designs. A half-cell model, ...

Flow battery electrode thickness

Download Citation | On Mar 1, 2025, M Maruthi Prasanna and others published Effect of electrode thickness and compression on the performance of a flow-through mode vanadium redox flow battery ...

In the present study, we investigate independently the effects of electrode compression and electrode thickness on the hydraulic and electrochemical performance of a vanadium redox flow ...

The electrode thickness is a critical design parameter determining the overall flow cell performance through the available surface area for reactions, current and potential distributions, and ...

It is of significance to clarify the effects of electrolyte concentration, electrode thickness and flow channel on the battery performance for the application of the ORFB technology.

The effects of electrode thickness, electrode porosity, electrolyte flow rate and concentration on the power-based efficiency and electrochemical performance of VRFB has been ...

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