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Title: Characteristics of perfluorosulfonic acid ion exchange in flow batteries

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Can perfluorosulfonic acid be used in proton exchange membrane fuel cells?

Investigations of Dongyue Series Perfluorosulfonic Acid Membranes for Applications in Proton Exchange Membrane Fuel Cells (PEMFCs).

Are perfluorosulfonic membranes suitable for vanadium redox flow batteries?

A series of perfluorosulfonic membranes is screened for application in vanadium redox flow batteries (VRFB): membranes of constant thickness 50 μm with different ion-exchange capacities ranging from 0.56 to 1.15 meq.g⁻¹.

What is a perfluorosulfonic acid membrane?

The perfluorosulfonic acid family of membranes includes a range of products from different manufacturers, under trade names of Nafion(TM) (DuPont), Flemion(TM) (Asahi Glass) and Hyflon(TM) (Solvay-Solexis) and Aquivion(TM) (Solvay), using, for example, different side chains. Such materials are often referred to as ionomer membranes.

Why are perfluorosulfonic acid membranes not suitable for high-temperature operation?

Besides the limited thermal stability of perfluorosulfonic acid polymers itself, as a result of too low glass transition temperature, the limitations of the most widely used membranes with respect to high-temperature operation are primarily set by the dependence on water for proton mobility.

A series of perfluorosulfonic membranes is screened for application in vanadium redox flow batteries (VRFB): membranes of constant thickness 50 μm with different ion ...

In this study, we demonstrate an ultrathin (~30 nm) PFSA membrane with highly ordered hydrophilic domains.

The perfluorosulfonic acid ion exchange membrane has narrow molecular weight distribution, controllable molecular weight, larger crystalline area and crystallinity, good ion selectivity, ...

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It is also important for applications like flow batteries and electro dialysis-driven mining of desalination brine, in which ion transport (and selectivity) are important.

This review summarizes the approaches to their modification, which will allow the creation of materials with a different set of functional properties, differing in ion transport (first of all proton ...

In particular, one of the most critical components in all-vanadium redox flow batteries, proton exchange membrane fuel cells and ion membrane chlor-alkali process devices is the ...

The ion exchange capacity (IEC), water uptake (WU), and thickness swelling ratio (SR) of the Dongyue PFSA membranes were higher than those of Nafion 211 membranes.

The microstructure of perfluorinated sulfonic acid proton-exchange membranes such as Nafion significantly affects their transport properties and performance in a vanadium redox-flow ...

Commercial perfluorosulfonic acid membrane materials (PSFAs), such as Nafion and Selemion, are widely used in flow battery, which are composed of polytetrafluoroethylene (PTFE) ...

This review addresses the microstructure of PFSA membranes and its change induced by water and solvent uptake and discusses the features of ion and gas transport, ...

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