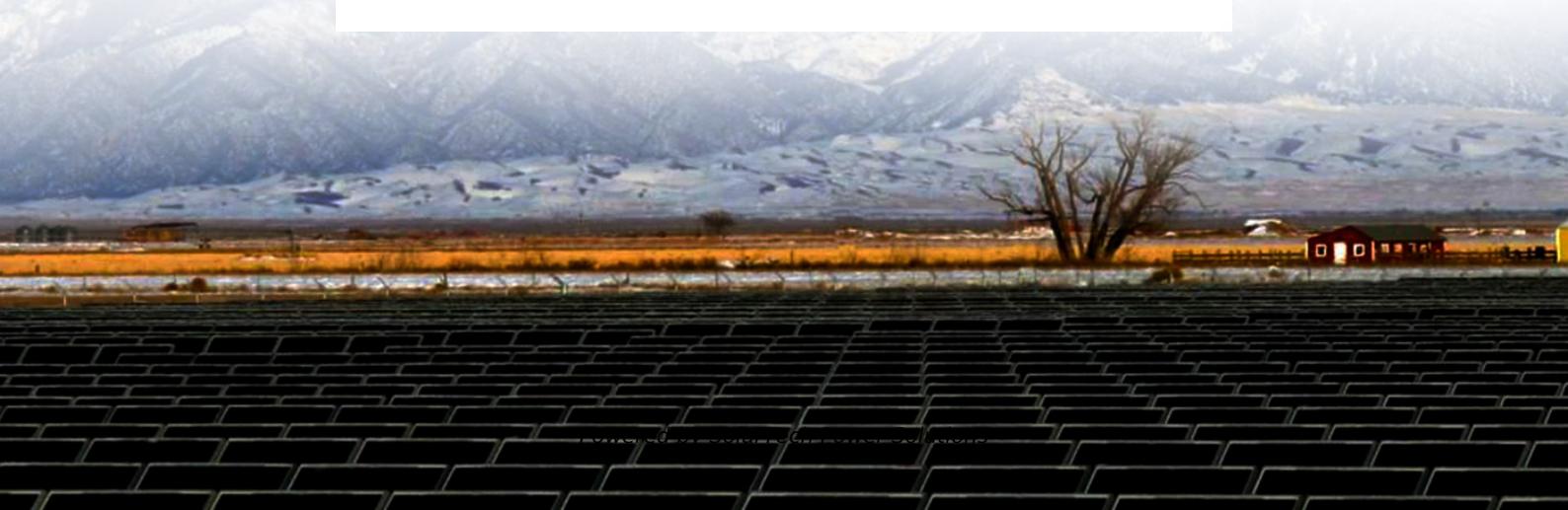


Do vanadium liquid flow batteries require phosphoric acid



Overview

What is a Commercial electrolyte for vanadium flow batteries?

Commercial electrolyte for vanadium flow batteries is modified by dilution with sulfuric and phosphoric acid so that series of electrolytes with total vanadium, total sulfate, and phosphate concentrations in the range from 1.4 to 1.7 m, 3.8 to 4.7 m, and 0.05 to 0.1 m, respectively, are prepared.

What is a vanadium redox flow battery (VRFB)?

In the case of Vanadium redox flow batteries (VRFBs), the electrolyte solution containing different valences of vanadium in the anolyte and catholyte is separated by a membrane. Due to their independent power output and energy capacity, VRFBs are easily scalable and therefore suitable for large-scale energy storage applications.

What is the Cs value for vanadium electrolytes based on sulfuric acid?

The CS value for vanadium electrolytes based on sulfuric acid is commonly in the range from 3 to 5 m according to the published data. The modification of electrolyte composition in this study includes consideration and variation of CV / CS ratio for the electrolyte composition by addition of acid and/or dilution of electrolyte.

Can diluted vanadium electrolyte improve battery cyclability during galvanostatic charge-discharge operation?

The application of diluted vanadium electrolyte (CV of 1.4 m and CP of 0.1 m) can be reasonable to improve battery cyclability during galvanostatic charge-discharge operation in terms of capacity decay and ohmic losses.

Does vanadium electrolyte composition affect electrolytes stability in a negative half-cell?

In contrast to the positive electrolyte, the effect of vanadium electrolyte composition on the electrolyte stability in negative half-cell is less

investigated. The lower potential of V (III)/V (II) redox couple thermodynamically allows for simultaneous hydrogen evolution reaction (HER) on the negative electrode of the VFB.

What oxidation state is a commercial vanadium electrolyte?

Batches of commercial vanadium electrolyte (in V 3.5+ oxidation state [commercial vanadium electrolyte contains V (III) and V (IV) species in molar ratio close to 50:50% and is therefore denoted as V 3.5+ electrolyte]) were purchased from AMG TITANIUM ALLOYS & COATINGS GfE Metalle und Materialien GmbH.

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