

## ContainerPower Energy Solutions

# Brazil's new all-vanadium flow battery



## Overview

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Are vanadium redox flow batteries viable?

Among these systems, vanadium redox flow batteries (VRFB) have garnered considerable attention due to their promising prospects for widespread utilization. The performance and economic viability of VRFB largely depend on their critical components, including membranes, electrodes, and electrolytes.

What is vanadium redox flow battery (VRFB)?

Among the various types of RFBs, vanadium redox flow battery (VRFB) stands out for its ability to eliminate cross-contamination between electrolytes, a common issue in other flow battery chemistries which induces self-discharge of the device.

Who invented all-vanadium redox flow batteries?

Skyllas-Kazacos et al. developed the all-vanadium redox flow batteries (VRFBs) concept in the 1980s . Over the years, the team has conducted in-depth research and experiments on the reaction mechanism and electrode materials of VRFB, which contributed significantly to the development of VRFB going forward , , .

What are all-vanadium redox flow batteries?

All-vanadium redox flow batteries use V (II), V (III), V (IV), and V (V) species in acidic media. This formulation was pioneered in the late eighties by the research group of Dr Maria Skyllas-Kazacos as an alternative to the Fe/Cr chemistry originally proposed by NASA.

Which chemistry is best for redox flow batteries?

The most commercially developed chemistry for redox flow batteries is the all-vanadium system, which has the advantage of reduced effects of species crossover as it utilizes four stable redox states of vanadium. This chapter reviews the state of the art, challenges, and future outlook for all-vanadium

redox flow batteries. 1.

What is a commercial vanadium electrolyte?

Currently, commercial vanadium electrolytes are primarily H<sub>2</sub>SO<sub>4</sub> (2.5–3.5 mol/L) solutions dissolving 1.5–2 mol/L vanadium, with energy densities typically around 25 Wh/L, significantly lower than Zn mixed flow batteries, which can achieve energy densities up to 70 Wh/L [10, 20].

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