

Croatia s vanadium reserves for all-vanadium flow batteries





Overview

Can vanadium flow batteries decarbonize the power sector?

Vanadium flow batteries show technical promise for decarbonizing the power sector. High and volatile vanadium prices limit deployment of vanadium flow batteries. Vanadium is globally abundant but in low grades, hindering economic extraction. Vanadium's supply is highly concentrated as co-/by-product production.

Why is the global vanadium market so volatile?

With so few countries dictating the production, the global vanadium market has experienced strong price volatility in response to local changes (see Fig. 1) , and this uncertainty increases risk for investments in large-scale and capital-intensive VRFB systems to attract investment.

Why is vanadium a problem?

High and volatile vanadium prices limit deployment of vanadium flow batteries. Vanadium is globally abundant but in low grades, hindering economic extraction. Vanadium's supply is highly concentrated as co-/by-product production. Opportunities for growth of vanadium supply lie in principal and secondary streams.

How many oxidation states are in a vanadium battery?

Typically, there are two storage tanks containing vanadium ions in four oxidation states: V^{2+} , V^{3+} , VO^{2+} (V^{4+}), and VO^{2+} (V^{5+}). Each tank contains a different redox couple. 1 The positive side of the battery connects to the electrolyte and electrode associated with V^{4+} and V^{5+} ions.



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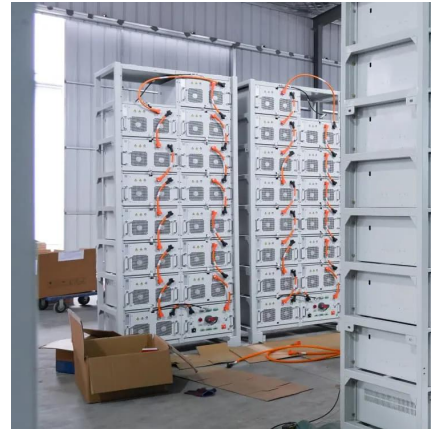
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