

Titanium ion redox flow battery

Redox flow battery with low cost, high electromotive force and current density

Overview

The amount of electricity generated by renewable energy varies a lot on climate, etc. Therefore, it is preferable to use it in combination with storage battery in order to supply stable electric power. Redox flow battery (RFB), which charges and discharges by ion redox reaction, is highly valued for its safety due to its nonflammability, its high durability as the electrolyte & electrode hardly deteriorate, and its low running cost. Vanadium RFB is in practical use but in recent years, the resource price of vanadium active material has jumped, resulting in high initial cost.

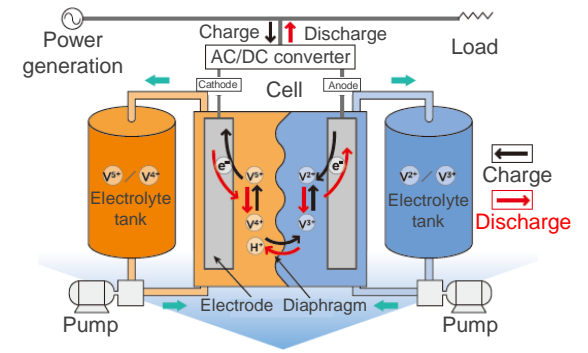
This invention uses only titanium as active material for both cathode / anode chambers, which significantly reduces the initial cost. There is existing RFB technology that combines titanium and manganese, but using different elements in the cathode / anode chambers risks contamination due to its principle, so a premature battery degradation could be expected. This invention has an advantage in this field and it is also expected to realize more efficient RFB because of its higher electromotive force and current density that can be extracted compared to conventional vanadium ion RFB.

Product Application

- ❑ Renewable and natural energy source system stabilization
- ❑ Surplus power storage and frequency regulation for electric power company
- ❑ Possible to determine accurate charge & discharge amounts for direct measurement of electromotive force

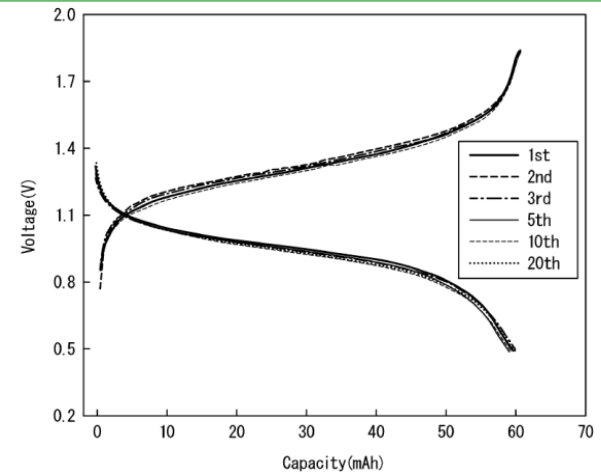
IP Data

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Conceptual diagram of RFB (Figure is for vanadium RFB)
 Image from https://sumitomoelectric.com/jp/sites/japan/files/2021-07/download_documents/Redox_Flow_Battery_2021.pdf

Low damping and excellent cycle characteristics



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