Battery performance test 250 kWh

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The electricity generation cost using renewable resources has been reduced to such a low level that it is possible to replace all the fossil fuel-based energy with renewables soon. However, the intermittent property with most renewables, such as solar and wind, requires vast amount, flexible and affordable energy storage products. None of the current widely used energy storage technologies can meet these requirements.

An aqueous-based true redox flow battery has many unique advantages, such as long lifetime, safe, non-capacity decay, minimal disposal requirement, and flexible power and energy design. All these make it a great candidate for the vast renewable energy storage market. The key issue with this technology is the cost and availability of the energy-storage media. Due to the limited vanadium resources, it is difficult for the widely studied vanadium-based redox flow battery to be commercially used for fast-growing renewable energy storage market.

Iron-chromium redox flow battery was invented by Dr. Larry Thaller"s group in NASA more than 45 years ago. The unique advantages for this system are the abundance of Fe and Cr resources on earth and its low energy storage cost. Even for a mixed Fe/Cr system, the electrolyte cost is still less than 10$/kWh. The major issue with this system is the continuous capacity decay due to hydrogen generation, which makes this system impractical for long-term operations.

In the past two years, this limiting problem was successfully solved by researchers at Creek Channel, Inc.1,2 By using a special system design, the hydrogen generation level was largely reduced, down to less than 0.5% per full cycle. A capacity recovery system was also successfully developed, which can compensate the system capacity loss due to hydrogen generation. More than 1000 cycles of operation have been carried out using a system with a kW-scale stack and 100 L electrolyte over a few months. Stable system capacity and stable continuous operation were successfully achieved.

In this presentation, detail performance of the 250 kWh battery unit will be discussed. US 10777836 B1. Redox Flow Battery Systems Including a Balance Arrangement and Methods of Manufacture and Operation.

US 10826102 B1. Fe-Cr Redox Flow Battery Systems Including a Balance Arrangement and Methods of Manufacture and Operation.

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