HIGH ENERGY DENSITY ECOLOGICALLY FRIENDLY BATTERIES FOR GRID CONNECTION OF RENEWABLE SOURCES AND ELECTRIC VEHICLES

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Introduction. Aqueous Rechargeable lithium batteries (ARLBs) could be an attractive alternative to bypass safety issues of lithium-ion batteries with organic electrolyte. Moreover, the fast lithium diffusion in aqueous electrolyte media could allow for the operations under high electric current conditions required especially for high power supply [1]. In 1994, J. Dahn *et al* reported a $VO_2/LiMn_2O_4$ rechargeable aqueous battery [2]. However, this type of batteries had serious issues with cyclability. In this work, we report for the first time on a system comprising in an aqueous electrolyte, and on large-scale ARLB based on this concept with enhanced cycle performance and energy density.

Materials and methods. All electrochemical tests were carried out using galvanostat/ potentiostat (Arbin, USA) in a Swagelok-type cell and a rolled cylindrical battery configuration. The commercial $LiFePO_4$ (HITACHI, Japan) powder was used as cathode.

Results and discussion. The novel battery maintained excellent stability with capacity of 93 $mAhg^{-1}$ after 400 cycles when cycled at 6 C **(Fig. 1).** The further details about large cylindrical cell will be presented at the poster session.

Conclusions. A novel rechargeable battery with an optimized binary electrolyte has been developed. The ARLB system offers a very promising high safety, low cost, long cycling life, an attractive energy and power densities system for large scale applications.

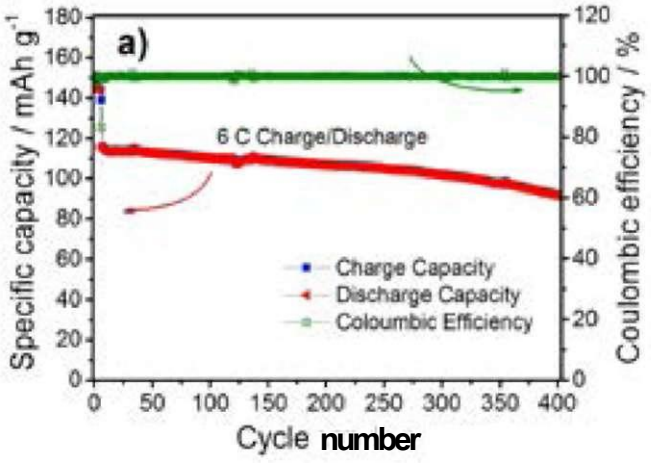

Fig. 1. Cycle performances and coulombic efficiency of the cell at 6 C.

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