7, the solubility of Fe^{2+} and Fe^{3+} ions is higher in H_2SO_4—HCl mixed acids than in hydrochloric acid.

TABLE 1

Stability of Fe^{n+} cations in the H_2SO_4—HCl mixed solutions

Fe^{n+} specie	Fe^{n+}, M	H^+, M	SO_4^{2-}, M	Cl^-, M	T. ° C.	Time for precipitation
Fe^{2+}	2	4	2	4	25	Stable (>6 d)
Fe^{3+}	2	6	2	6	25	Stable (>6 d)

While a number of embodiments of the present invention have been shown and described, it will be apparent to those skilled in the art that many changes and modifications may be made without departing from the invention in its broader aspects. The appended claims, therefore, are intended to cover all such changes and modifications as they fall within the true spirit and scope of the invention.

We claim:

1. A battery system comprising:

an all-vanadium redox flow battery system including vanadium cations, the system including

an anolyte comprising V^{2+} and V^{3+};

a catholyte comprising V^{4+} and V^{5+}; and

an aqueous supporting solution comprising chloride for both the anolyte and the catholyte, and the aqueous supporting solution having a water content of greater than about 60 wt %.

2. The system of claim **1**, wherein the catholyte comprises $VO_2Cl(H_2O)_2$.

3. The system of claim **1** having a cell temperature greater than 40° C. during operation.

4. The system of claim **1** having a cell temperature between −35° C. and 60° C. during operation.

5. The system of claim **4** absent a thermal management device actively regulating the cell temperature.

6. The system of claim **1** having a state-of-charge condition greater than 0% and less than 100% during operation.

7. The system of claim **1**, wherein vanadium cation concentration in the anolyte or in the catholyte or in both the anolyte and in the catholyte, is greater than 0.5 M.

8. The system of claim **1**, wherein vanadium cation concentration in the anolyte or in the catholyte or in both the anolyte and in the catholyte, is greater than 1.7 M.

9. The system of claim **1**, wherein vanadium cation concentration in the anolyte or in the catholyte or in both the anolyte and in the catholyte, is greater than 2.5 M.

10. A vanadium-based redox flow battery system comprising:

an anolyte and a catholyte having electrochemically active ions that consist essentially of vanadium ions;

the anolyte comprising V^{2+} and V^{3+};

the catholyte comprising V^{4+} and V^{5+}; and

an aqueous supporting solution comprising chloride for both the anolyte and the catholyte, and the aqueous supporting solution having a water content of greater than about 66 wt %.

11. The system of claim **10**, wherein the aqueous supporting solution consists essentially of a mixture of chloride ions and hydrogen ions, vanadium ions and vanadium oxide ions.

12. A battery system comprising:

an all-vanadium redox flow battery system, the system including an anolyte comprising V^{2+} and V^{3+};

a catholyte comprising V^{4+} and V^{5+};

a separator or a membrane separating the anolyte and the catholyte; and

an aqueous supporting solution comprising chloride for both the anolyte and the catholyte, and the aqueous supporting solution having a water content of greater than about 66 wt %.

13. An all-vanadium redox flow battery system comprising:

the anolyte comprising V^{2+} and V^{3+};

the catholyte comprising V^{4+}, V^{5+} and $VO_2Cl(H_2O)_2$; and

an aqueous supporting solution comprising chloride, and the aqueous supporting solution having a water content of greater than about 60 wt %.

14. The system of claim **1** wherein the aqueous supporting solution has a water content of greater than about 66 wt %.

15. The system of claim **13** wherein the aqueous supporting solution has a water content of greater than about 66 wt %.

16. The system of claim **1** wherein the aqueous supporting solution has a water content of greater than about 66 wt % to about 76 wt %.

17. The system of claim **13** wherein the aqueous supporting solution has a water content of greater than about 66 wt % to about 76 wt %.

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