CLAIMS

1. An electrolyte for a battery, the electrolyte comprising:

a solvent comprising water and sulfuric acid;

a vanadium salt;

a deprotonation inhibitor for $[VO_2(H_2O)_3]^+$; and

a V_2O_5 precipitation inhibitor, which is an organic compound selected from one or more of the group consisting of polyvinylpyrrolidone (PVP), and a water-soluble polyalkylene glycol.

2. The electrolyte for a battery of Claim 1, wherein:

the deprotonation inhibitor for $[VO_2(H_2O)_3]^+$ is an inorganic compound.

3. The electrolyte for a battery of Claim 2, wherein the inorganic compound is present in an amount of from 0.001 to 3 wt% of the combined weight of the vanadium salt and the solvent.

4. The electrolyte for a battery of Claim 3, wherein the inorganic compound is present in an amount of from 0.25 to 1 wt% of the combined weight of the vanadium salt and the solvent.

5. The electrolyte for a battery of Claim 2 wherein the inorganic compound is selected from one or more of the group consisting of a phosphate salt and a non-halide ammonium containing compound, or from one or more of the group consisting of a sodium phosphate, a potassium phosphate and an ammonium phosphate.

6. The electrolyte for a battery of Claim 6, wherein the inorganic compound is one or both of $NH_4H_2PO_4$ and $(NH_4)_2HPO_4$.

7. The electrolyte for a battery of Claim 1, wherein the organic compound is present in an amount of from 0.0001 to 0.5 wt% of the combined weight of the vanadium salt and the solvent.

8. The electrolyte for a battery of Claim 1, wherein the organic compound is present in an amount from 0.025 to 0.1 wt% of the combined weight of the vanadium salt and the solvent.

9. The electrolyte for a battery of Claim 1,

wherein the organic compound is selected from one or more of polyvinylpyrrolidone and polyethylene glycol, and the inorganic compound includes $NH_4H_2PO_4$ and the organic compound includes PVP.

10. The electrolyte for a battery of Claim 2, wherein the inorganic compound includes $(NH_4)_2HPO_4$ and the organic compound includes PVP.

11. The electrolyte for a battery of Claim 1, wherein the vanadium salt comprises a vanadium sulfate.

12. The electrolyte for a battery of Claim 1, wherein the electrolyte comprises vanadium ions in a concentration of from 1.0 to 3.0 M.

13. The electrolyte for a battery of Claim 12, wherein the electrolyte comprises vanadium ions in a concentration of from 1.6 to 2M.

14. The electrolyte for a battery of Claim 1, wherein the electrolyte comprises sulphate ions in a concentration of from 2 to 6M.

15. The electrolyte for a battery of Claim 14, wherein the electrolyte comprises sulphate ions in a concentration of from 4 to 5M.

16. An electrolyte for a battery of claim 1, the electrolyte comprising:

water;

vanadium ions present in a concentration from 1.6 M to 2M;

sulfate ions present in a concentration of from 4 M to 5M; and

at least two additives, wherein:

the at least two additives prevent the precipitation of more than 150 mg of V_2O_5 per 2 mL of the electrolyte following heating of

the electrolyte for 7 days at 50°C; and

where the at least two additives include:

ammonium phosphate present in an amount of from 0.25 to 1 wt% of the weight of the electrolyte without the additives; and

PVP present in an amount of from 0.025 to 0.1 wt% of the weight of the electrolyte without the additives.

17. A redox flow battery comprising the electrolyte of Claim 1.

18. A kit of parts for stabilizing a vanadium electrolyte for use in a vanadium redox flow battery, the kit of parts comprising:

the electrolyte for a battery of Claim 1.

19. A method of stabilizing a vanadium electrolyte for use in a vanadium redox flow battery, the vanadium electrolyte comprising:

a solvent comprising water and sulfuric acid, and

a vanadium salt, the method comprising obtaining a stabilized electrolyte by:

adding a deprotonation inhibitor for $[VO_2(H_2O)_3]^+$ and a V_2O_5

precipitation inhibitor to the vanadium electrolyte,

wherein the V_2O_5 precipitation inhibitor is an organic compound selected from one or more of the group consisting of polyvinylpyrrolidone (PVP), and a water-soluble polyalkylene glycol.

20. A method of storing energy comprising charging the redox flow battery of Claim 17.