CLAIMS

What is claimed is:

1. A method of treating a spent electrolyte solution, comprising adding water to the spent electrolyte solution to induce precipitation of metal hydroxide, optionally with the help of seeding, separating the so-formed precipitate from the aqueous mother liquor and recovering an alkali hydroxide solution.
2. A method according to claim 1, further comprising adding one or more water-miscible, low-boiling point organic solvent(s) to the spent electrolyte solution, separating the metal hydroxide precipitate from the aqueous/organic mother liquor, removing said organic solvent from the mother liquor, and recovering an aqueous alkali hydroxide solution.
3. The method of claim 2, wherein said organic solvent is selected from the group consisting of alcohols, ketones, dioxolane, dioxanes, tetrahydrofuran.
4. The method of claim 3, wherein said alcohol is methanol, ethanol, propanol or a combination thereof.
5. A method of operating an aluminum/air battery, comprising withdrawing from said battery a spent electrolyte solution of alkali metal aluminate, adding water to said solution to induce precipitation of aluminum hydroxide, separating the so-formed precipitate from the aqueous mother liquor and directing the mother liquor comprising aqueous alkali hydroxide back to an aluminum/air battery.
6. The method of claim 1, wherein said metal hydroxide is aluminum hydroxide or zinc hydroxide.
7. The method of claim 1, wherein said spent electrolyte comprises alkali metal aluminates and wherein said alkali is sodium or potassium.
8. The method of claim 1, wherein said seeding comprising adding alumina powder, aluminum hydroxide powder, or zinc oxide powder as a seed to said electrolyte.
9. The method of claim 1, wherein said water is added in a volume ranging between 30%-80% from 100% volume of said spent electrolyte.
10. The method of claim 2, wherein said co-solvent is added in a volume ranging between 10%-300% from 100% volume of said spent electrolyte.

CLAIMS

What is claimed is:

1. A method of treating a spent electrolyte solution of a metal-air battery, the method comprising: adding water and one or more organic solvent(s), or adding one or more organic solvent(s) to the spent electrolyte solution to induce precipitation of metal hydroxide, optionally with the help of seeding, separating the metal hydroxide precipitate from the aqueous-organic mother liquor, removing said organic solvent(s) from the mother liquor, and recovering a solution comprising aqueous alkali hydroxide.
2. The method of claim 1, wherein said organic solvent is selected from the group consisting of alcohols, ketones, dioxolane, dioxanes, tetrahydrofuran.
3. The method of claim 2, wherein said alcohol is methanol, ethanol, propanol or a combination thereof.
4. A method of operating an aluminum/air battery, comprising withdrawing from said battery a spent electrolyte solution of alkali metal aluminate, adding water and one or more organic solvent(s), or adding one or more organic solvent(s) to said solution to induce precipitation of aluminum hydroxide, separating the so-formed precipitate from the aqueous-organic mother liquor, removing said organic solvent(s) from the mother liquor and directing the mother liquor comprising aqueous alkali hydroxide back to said aluminum/air battery.
5. The method of claim 1, wherein said metal hydroxide is aluminum hydroxide or zinc hydroxide.
6. The method of claim 1, wherein said spent electrolyte comprises alkali metal aluminates and wherein said alkali-metal is sodium or potassium.
7. The method of claim 1, wherein said seeding comprising adding alumina powder, aluminum hydroxide powder, or zinc oxide powder as a seed to said electrolyte.
8. The method of claim 1, wherein said water is added in a volume ranging between 30%-80% from 100% volume of said spent electrolyte.

9. The method of claim 1, wherein said co-solvent is added in a volume ranging between 10%-300% from 100% volume of said spent electrolyte.

10. The method of claim 1, wherein said addition of water and one or more organic solvent(s) or said addition of one or more organic solvent(s) is conducted sequentially or by addition of a mixture.

11. The method of claim 1, wherein the step of removing said organic solvent from the mother liquor is conducted by distillation.

12. The method of claim 1, wherein following the step of removing said organic solvent from the mother liquor, said organic solvent is recycled.