CLAIMS

1. A method for the recovery of metals from a feed stream containing one or more value metals and lithium, the method comprising:

    subjecting the feed stream to a sulphuric acid leach to form a slurry comprising a pregnant leach solution of soluble metal salts and a solid residue;

    separating the pregnant leach solution and the solid residue;

    subjecting the pregnant leach solution to a precipitation step to remove iron and aluminium, the precipitation step comprising the addition of ammonia to increase the pH of the pregnant leach solution to above 4.5;

    subjecting the pregnant leach solution to one or more separate solvent extraction steps, wherein each solvent extraction step recovers one or more value metals from the pregnant leach solution and where each solvent extraction step comprises the dosing of the pregnant leach solution with ammonia to maintain a target pH, the remaining pregnant leach solution comprising lithium; and

    recovery of lithium from the pregnant leach solution.

2. A method according to claim 1, wherein the feed stream comprises at least lithium and one or more of copper, iron, aluminium, manganese, cobalt and nickel.

3. A method according to claim 1 or 2, wherein the method further comprises the step of:

    subjecting the feed stream to a pretreatment process,

    prior to the step of subjecting the feed stream to a sulphuric acid leach.

4. A method according to claim 3, wherein the pre-treatment process comprises one or more mechanical treatment steps.

5. A method according to claim 3 or 4, wherein the mechanical treatment steps comprises one or more of: a crushing step and a shredding step.

6. A method according to any one of claims 3 to 5, wherein the pre-treatment process comprises one or more size reduction steps.

7. A method according to any one of claims 3 to 6, wherein the pre-treatment process comprises one or more beneficiation steps.

8. A method according to claim 7, wherein the one or more beneficiation steps include one or more of an air classification step, a magnetic classification step and a floatation step.

9. A method according to any one of the preceding claims, wherein the step of subjecting the feed stream to a sulphuric acid leach is conducted at atmospheric pressure.

10. A method according to any one of the preceding claims, wherein the step of subjecting the feed stream to a sulphuric acid leach is conducted at elevated temperature.

11. A method according to any one of the preceding claims, wherein the step of:

> subjecting the feed stream to a sulphuric acid leach to form a slurry comprising a pregnant leach solution of soluble metal salts and a solid residue,

more specifically comprises subjecting the feed stream to a sulphuric acid leach in one or more leach reactors.

12. A method according to any one of the preceding claims, wherein each solvent extraction step comprises:

the contact of the pregnant leach solution with an extractant to extract one or more metals to produce a loaded extractant containing the one or more extracted metals;

the separation of the loaded extractant from the pregnant leach solution; and

the recovery of the metal from the loaded extractant.

13. A method according to any one of the preceding claims wherein one of the separate solvent extraction steps is adapted to recover manganese from the pregnant leach solution.

14. A method according to any one of the preceding claims, wherein one of the separate solvent extraction steps is adapted to recover cobalt from the pregnant leach solution.

15. A method according to any one of claims 1 to 12, wherein one of the separate solvent extraction steps is adapted to recover both cobalt and manganese from the pregnant leach solution.

16. A method according to any one of the preceding claims, wherein one of the separate solvent extraction steps is adapted to recover nickel from the pregnant leach solution.

17. A method according to any one of the preceding claims, wherein the separate solvent extraction steps are performed sequentially.

18. A method according to claim 17, wherein the separate solvent extractions step are performed in the sequence: copper, manganese, cobalt and nickel.

19. A method according to claim 17, wherein the separate solvent extractions step are performed in the sequence: copper, manganese and cobalt, and nickel.