[0008] In one embodiment of the present disclosure, the pressure-leaching process may be performed at a temperature in the range of 150 to 250 degrees C and a pressure in the range of 8 to 43 barg.

[0009] In one embodiment of the present disclosure, a filtrate of the first-stage pressure-leaching process may have an acidity of 10 g/L or less, and a filtrate of the second-stage pressure-leaching process may have an acidity of 50 g/L or more.

[0010] In one embodiment of the present disclosure, in the pressure-leaching process, oxygen may be introduced into a pressurizing device to have a pressure in the range of 2 to 8 barg.

[0011] In one embodiment of the present disclosure, the leaching process may further include a neutralization process of adjusting a pH by introducing the mixed hydroxide precipitate.

[0012] In one embodiment of the present disclosure, iron in a filtrate of the neutralization process may be precipitated in the form of an iron oxide compound.

[0013] In one embodiment of the present disclosure, in the neutralization process, the pH may be controlled to 2.5 to 4.0, and an iron concentration may be 100 mg/L or less.

[0014] In one embodiment of the present disclosure, a residue precipitated in the neutralization process may be introduced into the first-stage pressure-leaching process.

[0015] In one embodiment of the present disclosure, each of the first solvent extractant and the second solvent extractant may be D2EHPA (Di-(2-ethylhexyl) phosphoric acid).

[0016] In one embodiment of the present disclosure, the impurity removal process may further include a copper removal process, an aluminum removal process, and a magnesium removal process.

[0017] In one embodiment of the present disclosure, the copper removal process may include a process of precipitating copper by introducing sodium hydrogen sulfide (NaSH), and the aluminum removal process may include a process of precipitating aluminum by introducing sodium hydroxide (NaOH).

[0018] In one embodiment of the present disclosure, the magnesium removal process may include a process of additionally removing magnesium by introducing sodium fluoride (NaF) after the second-stage solvent extraction process.

WHAT IS CLAIMED IS:

1. A method for producing an aqueous solution containing nickel, cobalt and manganese, comprising:

a leaching process including a pressure-leaching process of leaching a raw material under pressure to form a leachate containing nickel, cobalt, manganese and impurities;

an impurity removal process of removing the impurities from the leachate;

a target substance precipitation process of precipitating a mixed hydroxide precipitate containing nickel, cobalt and manganese by introducing a neutralizing agent into a filtrate from which the impurities are removed; and

a dissolution process of dissolving the mixed hydroxide precipitate in an acid,

wherein the pressure-leaching process includes a first-stage pressure-leaching process and a second-stage pressure-leaching process of pressure-leaching a residue of the first-stage pressure-leaching process with an acidity higher than an acidity in the first-stage pressure-leaching process, and

the impurity removal process includes a first-stage solvent extraction process of selectively extracting zinc from the impurities by introducing a first solvent extractant and a second-stage solvent extraction process of selectively extracting magnesium from the impurities by introducing a second solvent extractant.

2. The method of claim 1, wherein a filtrate of the second-stage pressure-leaching process is sent to the first-stage pressure-leaching process.

3. The method of claim 1, wherein the pressure-leaching process is performed at a temperature in the range of 150 to 250 degrees C and a pressure in the range of 8 to 43 barg.

4. The method of claim 1, wherein a filtrate of the first-stage pressure-leaching process has an acidity of 10 g/L or less, and

a filtrate of the second-stage pressure-leaching process has an acidity of 50 g/L or more.

5. The method of claim 1, wherein in the pressure-leaching process, oxygen is introduced into a pressurizing device to have a pressure in the range of 2 to 8 barg.

6. The method of any one of claims 1 to 5, wherein the leaching process further includes a neutralization process of adjusting a pH by introducing the mixed hydroxide precipitate.

7. The method of claim 6, wherein iron in a filtrate of the neutralization process is precipitated in the form of an iron oxide compound.

8. The method of claim 6, wherein in the neutralization process, the pH is controlled to 2.5 to 4.0, and an iron concentration is 100 mg/L or less.

9. The method of claim 6, wherein a residue precipitated in the neutralization process is introduced into the first-stage pressure-leaching process.

10. The method of claim 1, wherein each of the first solvent extractant and the second solvent extractant is D2EHPA (Di-(2-ethylhexyl) phosphoric acid).

11. The method of claim 1, wherein the impurity removal process further includes a copper removal process, an aluminum removal process and a magnesium removal process.

12. The method of claim 11, wherein the copper removal process includes a process of precipitating copper by introducing sodium hydrogen sulfide (NaSH), and

the aluminum removal process includes a process of precipitating aluminum by introducing sodium hydroxide (NaOH).

13. The method of claim 11, wherein the magnesium removal process includes a process of additionally removing magnesium by introducing sodium fluoride (NaF) after the second-stage solvent extraction process.

14. The method of claim 13, wherein the sodium fluoride is introduced in an amount of 1.4 equivalents (eq) or more.

15. The method of claim 1, wherein in the target substance precipitation process, a pH is controlled to 9.0 to 10.0 by introducing a neutralizing agent.

16. The method of claim 1, further comprising:

a raw material preparation process of preparing the raw material prior to the leaching process,

wherein the raw material preparation process includes a roasting process of forming a nickel oxide ore from a nickel sulfide ore.

17. The method of claim 16, wherein sulfuric acid is produced using sulfur dioxide produced in the roasting process, and is used as a solution introduced into the leaching process.