WHAT IS CLAIMED IS:

1. A method of obtaining a metal salt from a spent lithium-ion (Li-ion) battery, the method comprising:

contacting a leaching solvent to a portion of the spent Li-ion battery to obtain a first dispersion;

heating the first dispersion to a temperature in a range from 50 ^{o}C to 90 ^{o}C by applying microwave radiation;

maintaining the temperature of the first dispersion in the range from 50 ^{o}C to 90 ^{o}C for a period in a range from 10 seconds to 5 minutes by further applying microwave radiation to the heated first dispersion;

filtering the first dispersion to obtain a first filtrate; and

contacting a first base with the first filtrate to increase a pH of the first filtrate to a first predetermined value at which a first metal salt is precipitated from the first filtrate.

2. The method of claim 1, wherein the first metal salt comprises lithium, aluminum, iron, cobalt, copper, manganese, and/or nickel.

3. The method of claim 1, wherein the leaching solvent comprises sulfuric acid.

4. The method of claim 3, wherein the leaching solvent further comprises an oxidizing agent.

5. The method of claim 4, wherein the oxidizing agent is hydrogen peroxide.

6. The method of claim 1, wherein the leaching solvent has a pH in a range from 0 to 7.0

7. The method of claim 1, wherein heating the first dispersion further comprises stirring the first dispersion while applying the microwave radiation.

8. The method of claim 1, wherein maintaining the temperature of the first dispersion comprises controlling application of the microwave radiation using a controller.

9. The method of claim 1, wherein heating the first dispersion comprises heating the first dispersion to a temperature in a range from 60 ºC to 80 ºC.

10. The method of claim 1, wherein maintaining the temperature comprises maintaining the temperature of the first dispersion in a range from 60 ºC to 80 ºC, for a period in a range from 30 seconds to 5 minutes.

11. The method of claim 1, wherein the portion of the spent lithium-ion battery comprises metal pieces, and a black mass comprising graphite and metal oxides.

12. The method of claim 11, wherein filtering the first dispersion comprises filtering the first dispersion through a sieve.

13. The method of claim 1, wherein heating the first dispersion further comprises continuously stirring the first dispersion while applying the microwave radiation.

14. The method of claim 1, wherein maintaining the temperature of the first dispersion further comprises continuously stirring the first dispersion while applying the microwave radiation.

15. The method of claim 1, wherein the first base comprises sodium carbonate and/or ammonium carbonate.

16. The method of claim 1, further comprising obtaining a second filtrate following the precipitation of the first metal salt.

17. The method of claim 16, further comprising contacting a second base with the second filtrate to increase a pH of the second filtrate to a second predetermined value to precipitate a second metal salt.