

CLAIMS

We claim:

- 5 1. A process for recovering valuable metals from spent lithium ion batteries comprising the steps of:
 - 10 a) shredding the lithium ion batteries into particles of a preferable size, in water, with water level well above the level of the batteries being shredded to obtain a slurry and shredded plastic and Teflon matrix;
 - 15 b) removing the plastic and Teflon matrix that floats on the water in step a);
 - c) wet screening the slurry obtained in step a) through sieve of at least fifty mesh size to separate particles of varying sizes; wherein
15 coarser particles containing copper, aluminum and protection circuit modules form screened slurry containing solids are retained by the sieve and collected, and finer particles containing lithium and cobalt are aggregated;
 - 20 d) filtering the lithium and cobalt containing aggregate of step c) through a filter press to obtain a wash liquor containing lithium and a residue containing cobalt, metal impurities and organic matrix;
 - e) drying the residue of step d) and roasting the dried residue at 900 °C to obtain cobalt oxide;
 - 25 f) washing and filtering the cobalt oxide of step e) with dilute acid solution at pH range 2.0 to 3.0 to obtain pure cobalt oxide and filtrate;
 - 30 g) treating the wash liquor of step d) with saturated solution of soda ash at pH range 11 to 11.5 and temperature ranging from 80 to 120 °C for 3-6 hours to obtain lithium carbonate precipitate and supernatant.

2. The process for recovering metals of value as claimed in claim 1, wherein the preferable size of particles obtained through shredding is 10mm.
3. The process for recovering metals of value as claimed in claim 1, wherein
5 the coarser pieces of step c) are processed using magnetic separator to segregate magnetic part comprising protection circuit module from non magnetic part comprising copper and aluminum.
4. The process for recovering metals of value as claimed in claim 1, wherein
10 the supernatant of step g) and the filtrate of step f) are subsequently mixed and processed using repetition of step d) to step g).
5. The process for recovering metals of value as claimed in claim 1, wherein the dilute acid solution is preferably hydrochloric acid solution.
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6. The process for recovering metals of value as claimed in claim 1, wherein the cobalt oxide obtained in step f) has purity of 97% with cobalt content of more than 76%.
7. The process for recovering metals of value as claimed in claim 1, wherein
20 the cobalt oxide obtained in step f) has metal impurity level below 2%.
8. The process for recovering metals of value as claimed in claim 1, wherein the lithium carbonate obtained in step g) has purity of 98% with lithium
25 content of more than 18%.
9. The process for recovering metals of value as claimed in claim 1, wherein the lithium carbonate obtained in step g) has metal impurity level below
30 0.5%.