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Recycle Lithium (Li) From Li Batteries Waste

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Abstract

Millions of tons of electronics are tossed out each year. A small percentage is collected and responsibly reused or recycled, but most is not. Some steps have been taken to remedy the situation to extracting precious metals using medieval techniques that ruin their health and despoil the environment, but with limited success.

The objective of this study is separate the active substances from the cathode of spent lithium-ion batteries were dissolved in H_2SO_4 and H_2O_2 solution, and precipitated as $\text{CoC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ micro particles by addition of $(\text{NH}_4)_2\text{C}_2\text{O}_4$. After precipitation of the $\text{CoC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ product by filtration, the Li_2CO_3 precipitates were obtained by addition of Na_2CO_3 in the left filtrate.

The results showed that CoC_2O_4 and Li_2CO_3 can be obtained when experiment conditions are controlled at temperature 50°C , H_2O_2 2 % and H_2SO_4 2mol/L.

We recommended that recycling from lithium battery in order to apply in chemical industry.

المستخلص

يتم التخلص من ملايين الأطنان من الإلكترونيات كل عام يتم جمع وإعادة تدوير نسبة صغيرة بطريقة جيدة ولكن معظمها لا يتم إعادة تدويرها وإستخدامها لذا إتخذت بعض الخطوات لمعالجة النفايات الإلكترونية والإستفادة من المعادن الثمينة بإستخدام تقنيات العصور الوسطى التي تدمر الصحة والبيئة ونجاحها محدود.

الهدف من هذه الدراسة هو فصل المواد النشطة من كاثود بطارية الليثيوم ايون وتم اذابتها في H_2O_2

و H_2SO_4 ثم اضافته $(NH_4)_2C_2O_4$ لترسيب $CoC_2O_4 \cdot 2H_2O$ ثم اخذ الرشيق واضيف اليه Na_2CO_3

لترسيب Li_2CO_3 .

وأظهرت النتائج يمكن الحصول على كلا الراسبين بالتحكم في ظروف التجربة من درجة حرارة 50

$^{\circ}C$ ونسبة كل من H_2O_2 و H_2SO_4 ، H_2O_2 2 % و H_2SO_4 2 mol/L.

ونوصي بإعادة تدوير بطاريات الليثيوم من أجل تطبيقها في الصناعات الكيميائية.

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5-1 Conclusions:-

Note that the effect of pH, temperature, concentration of the solution and filtration time affects the solubility efficiency of the active substances and the temperature of the solution and pH affect the amount of sediment and the sedimentation efficiency of lithium and Cobalt resulting, we found that the precipitation condition to give Li and Co should be H_2SO_4 2 mol/L and H_2O_2 2%.

In order to obtain lithium carbonate Li_2CO_3 after the cobalt precipitation from the solution sodium carbonate was added to the filtrate to Li^+ and be molar ratio 1.1-1.0 and pH=10 and the temperature of 50°C and filtration time 1 hour

5-2 Recommendations:-

- Utilization of electronic waste in various fields.
- Utilization of lithium in the manufacture of both ceramics and glass and also enter the pharmaceutical industry and lubricants.
- Must take into account the conditions of the experiment of temperature and pH and the concentration of additives to obtain high efficiency sedimentation.
- Lithium can be introduced after conversion to lithium hydroxide in the manufacture of lithium lubricant grease where the preparation depends on the fat of chicken skin.