Process and plant for the treatment of run-down batteries.

KEYWORDS

- FLAT ALKALINE BATTERIES
- RUN-DOWN BATTERIES
- GREEN BATTERIES
- ZEROWASTE PROCESS
- TOTAL RECOVERY OF THE BATTERY COMPONENTS

AREA

- CHEMISTRY & BIOTECHNOLOGY

CONTACTS

- PHONE NUMBERS
+39.06.49910888
+39.06.49910855

- EMAIL
u_brevetti@uniroma1.it

Priority Number
n. 102004901263737
(ex RM2004A000578) del 25.11.2004.

Patent Type
Patent for invention.

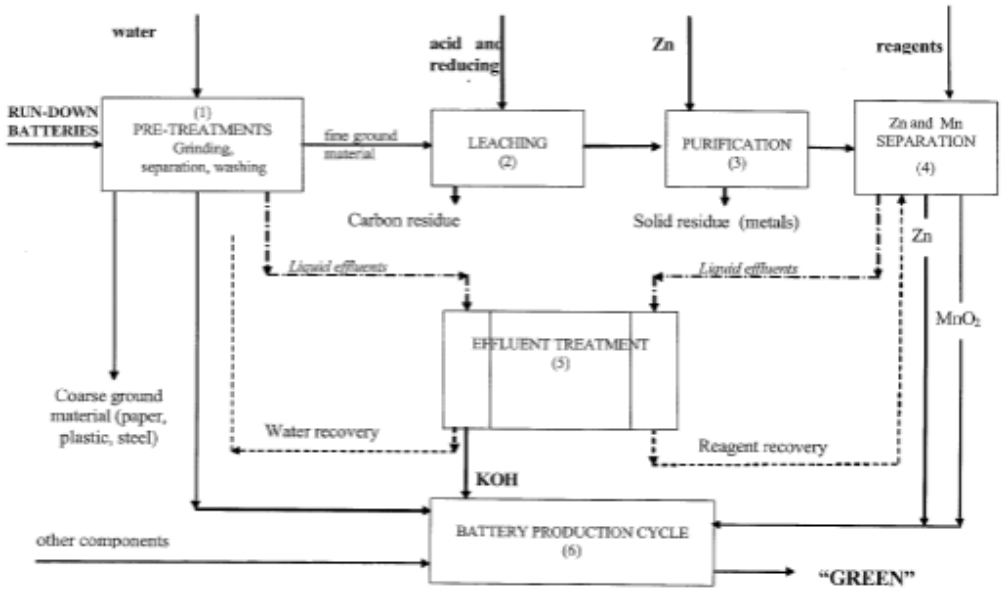
Ownership
Sapienza University of Rome 100%.

Inventors
Luigi Toro, Francesco Vegliò, Francesca Beolchini, Francesca Pagnanelli, Mariachiara Zanetti, Giuliana Furlani.

Industrial & Commercial Reference
Integral recovery and regeneration of run-down alkaline batteries for the production of new green batteries.

Time to Market
The process has been completely developed and tested.

LICENSED



Abstract
The present invention relates to a process and plant for the treatment of run-down batteries. In particular the invention concerns a zero-waste process for the recovery of flat alkaline batteries, aimed at the production of new batteries that can be defined as green.
The present invention relates to the treatment of dry batteries of the zinc-carbon and alkaline type, from which it is possible to recover, in particular, Zn and Mn.

In recent years there has been a growing interest in processes for the treatment of flat batteries, due to the obvious problems of environmental impact connected with the presence of significant quantities of heavy metals. Batteries, in fact, are considered special waste and by law must be disposed of in controlled refuse dumps; this type of disposal entails high costs for the community. Conversely, it is the metal content that makes flat batteries an interesting source of raw materials.

Process and plant for the treatment of run-down batteries.

Technical Description

The invention concerns a process and related treatment plant for flat Zn/Mn alkaline batteries.
The process comprises the following stages:

- pre-treatment (1) of the batteries comprising in succession the stages of grinding and separation of the two fractions (one coarse, one fine). The fine fraction undergoes the subsequent treatments, after washing in water to separate and recover the electrolytic solution contained in the batteries;
- acid-reducing leaching (2), using as reducing agent a carbohydrate chosen from among monosaccharides, oligosaccharides, polysaccharides and corresponding mixtures;
- purification (3) by cementation;
- separation (4) and recovery of metallic zinc and MnO 2 in forms that can be reused to produce new batteries;
- treatment of the solutions (5) by concentration and purification for the recovery of reagents and water.

New batteries can be produced from zinc and manganese dioxide obtained via the process of the invention.

Technologies & Advantages

The process proposed here differs from the others because:

- the leaching is performed either in one single phase or in two successive phases so that the first leach (acid leaching) contains all the zinc and part of the manganese and the second leach (acid-reducing leaching) contains only the manganese;
- carbohydrates are used as reducing agents; the reducing agents used are not polluting;
- since the batteries treated are only of the alkaline type, metals other than zinc and manganese present only as impurities can be removed by simple cementation;
- the process provides for the production of manganese dioxide both chemically (CMD - chemical manganese dioxide) and electrochemically (EMD - electrochemical manganese dioxide);
- it is a process for total recovery of the battery components aimed at the production of new batteries.

No polluting waste is produced at the plant outlet.

Applications

The process and the plant of the invention achieve the objective of creating a closed cycle in which the main components of the flat batteries (steel, zinc, manganese, electrolytic solution) are recovered as products that can be used for the production of new batteries, optimizing consumption of the reagents which are regenerated and/or concentrated for recirculation to the plants.

Possible applications:

- development of innovative "hydrometallurgical" processes for the treatment of batteries, WEEE, complex minerals, waste and mineral waste;
- realization of plants and prototypes aimed at recycling and recovery of secondary raw material.

CONTACTS

- PHONE NUMBERS
+39.06.49910888
+39.06.49910855

- EMAIL
u_brevetti@uniroma1.it

SAPIENZA UNIVERSITÀ DI ROMA

ASuRTT _ UFFICIO VALORIZZAZIONE E TRASFERIMENTO TECNOLOGICO
SETTORE BREVETTI E TRASFERIMENTO TECNOLOGICO
- http://uniroma1.it/ricerca/brevetti