

## Technology Offer

# Recovery of lead ions from aqueous waste solutions

## Summary

*A Romanian university has developed and patented an innovative method for the recovery of lead ions from aqueous waste solutions. The Romanian university is looking for foreign SMEs that are active in the field of industrial processes of the galvanic, electric and related industries. The Romanian university is offering a license and it is also looking for partners to work together for the further technological development.*

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<b>Last Update</b>	18 December 2015
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<b>Reference</b>	TORO20151116001

## Details

### Description

Located in the North-West part of the country, close to the Hungarian border, a Romania university has developed a method for the recovery of divalent lead ions from aqueous waste solutions resulted within the industrial processes of the galvanic, electric and related industries. The galvanic industry, the electrical and related industries use in an extensive manner the technology of lead electrochemical coating and following this industrial process the result is the emergence of rinse waters with low lead levels, but also waste solutions with high concentrations of lead, for which the treatment and recovery of lead is imposed.

The technical problem solved by the present method relates to set-up of the optimum conditions for the purge of the waste solutions containing divalent lead ions, in concentrations of 40 ... 1000 mg/L  $PB_{2+}$ , resulted in the electrochemical processes in nitric acid and sodium nitrate conditions. The goal is both to valorificate the lead as lead oxalate and to solve the problems of environmental quality.

The method for the recovery of lead ions from aqueous waste solutions has the advantage that the aqueous residual solution are treated at room temperature, under mechanical stirring for 10 minutes, with an oxalic acid solution in concentration of 0.5 M, in an excess of 10 ... 22% as compared to the required stoichiometric, at a pH between 4.5 and 5.5. The precipitated lead oxalate is settled, filtered, washed with distilled water, dried at room temperature, finally resulting a 98, 88% yield anhydrous crystalline lead oxalate, which can be subsequently subjected to an operation of low thermal decomposition at a temperature of 320 °C so as to obtain divalent lead oxide.

Having in view the fact that within the industrial processes of the galvanic, electric and related industries one uses extensively the technology of lead electrochemical coating, the Romanian university proposes this method for the recovery of lead ions and is offering a license to foreign SMEs active in the field of industrial processes of the galvanic, electric and related industries; the university is also looking for partners to work together for the further technological development.

## Advantages and Innovations

- the method uses as precipitation reagent the oxalic acid, which is cheap and accessible;
- the time for obtaining the crystalline lead oxalate is considerably reduced as compared to the time corresponding for the precipitation of the amorphous forms of known lead salts;
- decantation, filtration and washing speed of the precipitate are superior as compared to the amorphous forms used within other methods;
- considerable reduced volume for the crystallized precipitate;
- high purity of the lead oxalate;
- crystalline and anhydrous form of the recovered product;
- chemical stability to atmospheric factors (humidity, heat, light, carbon dioxide);
- the residual concentration of the lead ions is below 1 mg / L, according to SR ISO 9822;

## Stage of Development

Field tested/evaluated

## IPR Status

Patents granted

## Comment Regarding IPR status

Patent granted by the national State Office for Inventions and Trademarks.

## Keywords

### Technology

02002002	Coatings
02002015	Surface treatment (painting, galvano, polishing, CVD, ..)
02007010	Metals and Alloys
10002012	Remediation of Contaminated Sites
10004001	Industrial Water Treatment

### Market

08001007	Coatings and adhesives manufactures
08001012	Speciality metals (including processes for working with metals)
08004002	Chemical and solid material recycling
08004003	Water treatment equipment and waste disposal systems
08004004	Other pollution and recycling related

### NACE

M.72.1.1	Research and experimental development on biotechnology
M.72.1.9	Other research and experimental development on natural sciences and engineering

## Network Contact

## Issuing Partner

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS

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**Open for EOI :**    **Yes**

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## Dissemination

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### Send to Sector Group

Environment

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## Client

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### Type and Size of Organisation Behind the Profile

University

### Year Established

1991

### Already Engaged in Trans-National Cooperation

Yes

### Experience Comments

The method for the recovery of lead ions from aqueous waste solutions was tested within several local SMEs.

### Certification Standards

ISO 14001:2005

ISO 9001:2008

### Languages Spoken

English

### Client Country

Romania

## Partner Sought

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### Type and Role of Partner Sought

The potential partners could be any SME active in the field of galvanic, electric and related industries interested in a license agreement, so as to use the method for the recovery of divalent lead ions from aqueous waste solutions resulted within the industrial processes and thus preserving the environment.

Having in view the positive impact of this method on the environment, the potential partner could also be active in the field of industrial water treatment and/ or remediation of contaminated sites.

Concerning the technological cooperation agreement sought, would also like to find a foreign partner for the further technological development, by improving the existing method.

### Type and Size of Partner Sought

SME 11-50, SME <10, SME 51-250

### Type of Partnership Considered

License agreement

Technical cooperation agreement