LEREFLEOS

**Project ID:** BRE20119
**Funded under:** FP3-BRITE/EURAM 2

**LEAD RECOVERY FROM LEAD OXIDE SECONDARIES**

**From** 1993-01-01 **to** 1995-12-31

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<th><strong>Project details</strong></th>
<th><strong>Topic(s):</strong></th>
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<tr>
<td><strong>Total cost:</strong></td>
<td>1.2.1 - Recycling and recovery of industrial waste including non-ferrous metals</td>
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<tr>
<td>Not available</td>
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<td><strong>EU contribution:</strong></td>
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<td>EUR 2 100 000</td>
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<td><strong>Coordinated in:</strong></td>
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<td>Spain</td>
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**Funding scheme:**
- **CSC - Cost-sharing contracts**

**Objective**

- Initial foreseen objectives of this project were fully achieved.

- After more than 1,000 hours operating time, the results obtained in the pilot plant trials have demonstrated successfully the core technology of the PLACID process.

- About 10,000 Kg of electrolytic lead were produced after four continuous operating campaigns.

- The process is able to treat different raw materials. A blend of battery pastes and lead fumes were fed to the pilot plant. The leaching efficiency was above 99.5% Pb recovery.

- The quality of the electrolytic lead produced is maximum. Above 99.99% lead grade was reached working at nominal conditions. For instance, bismuth content of the lead product was 2 ppm.

- Although the PLACID process could be implemented alone for battery recycling, there are technical as well as economic and environmental advantages in using it integrated with a pyrometallurgical facility.

- The final evaluation study of the PLACID process, applied to a selected Base Case producing 20,000 T/y electrolytic lead presented very satisfactory results:
  - Obtained operating cost represents a saving of about 25% in respect to existing pyrometallurgical plants and obtained lead quality is ‘four nines’.
  - Outputs from the Discount Cash Flow study show very attractive economic data: pay-back time of 3.2 years and net internal rate of return of 24.1%, for a total investment cost of about 23 million US$.
  - The PLACID technology presents important environmental advantages in respect to conventional pyrometallurgical lead recycling plants, such as: non-hazardous residue production, lower quantity and lead content in the residue, no liquid effluent emission, no gasses and dusts evolution.
  - As a general conclusion can be said, that a new technological package to deal with scrap lead-acid batteries and other lead secondaries recycling has been fully developed in a soundly environmental way, technically feasible and economically attractive.

The proposed research and development programme is aimed at fully defining a new electrochemical and hydrometallurgical process capable of coping with lead oxide secondary materials such as smelting fumes and pastes from spent batteries.
recycling. The main advantages of this process in comparison to pyrometallurgical ones would be the following:

- lower operation and investment costs
- lower nominal capacity for industrial plant
- higher overall lead recovery: close to 98%
- higher quality of lead metal obtained
- safer from the environmental point of view
- no fumes and no hazardous wastes.

The major research tasks are:

1. Laboratory improvement and development of the main process stages (acid leaching, pregnant liquor purification, lead electrowinning by membrane cell, lead sponge handling and liquid bleed treatment and waste disposal).

2. Process definition and pilot plant arrangement

3. Pilot plant operation runs.

4. Final evaluation study

Successful completion should modify the technical approach for lead oxide secondaries recycling in the EC countries and developed countries as well. Depending on the results and competitor processes, the consortium thinks that several industrial plants will be built.

Related information

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