

SONOELECTROCHEMISTRY. Study of C/PbO₂ and Ti/PbO₂ anodes

1. Fundamentals aspects

1.1 Nucleation mechanisms and Growth

Influence of mechanical stirring and ultrasound

Influence of the surface topography

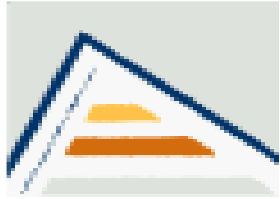
2. Preparation of electrodes

2.1 Preparative electrodeposition of technical anodes

Influence of operational variables ([C], pH, T...)

Influence of mechanical stirring and ultrasound

2.2 Test of corrosion resistance, durability, adhesion...



SONOELECTROCHEMISTRY. Study of C/PbO₂ and Ti/PbO₂ anodes

3. Specific equipment

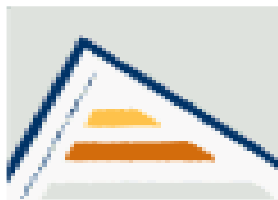
Commercial ultrasonic baths

Probe 20 kHz/100 W (Undatim)

Probe 300 kHz/100 W (Udatim)

4. Results

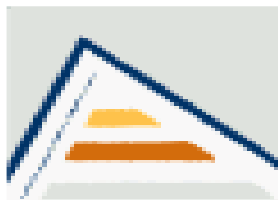
- *Appl. Surf. Sci.*, **78** (1994) 457.
- Spanish Pat. 9401259.
- *New J. Chem.* **22** (1998) 343.
- *Thin Solid Films.*, 352 (1999) 49
- *New J. Chem.* **25** (2001) 1195.
- *Electrochem. Commun.*, 4 (2002) 370



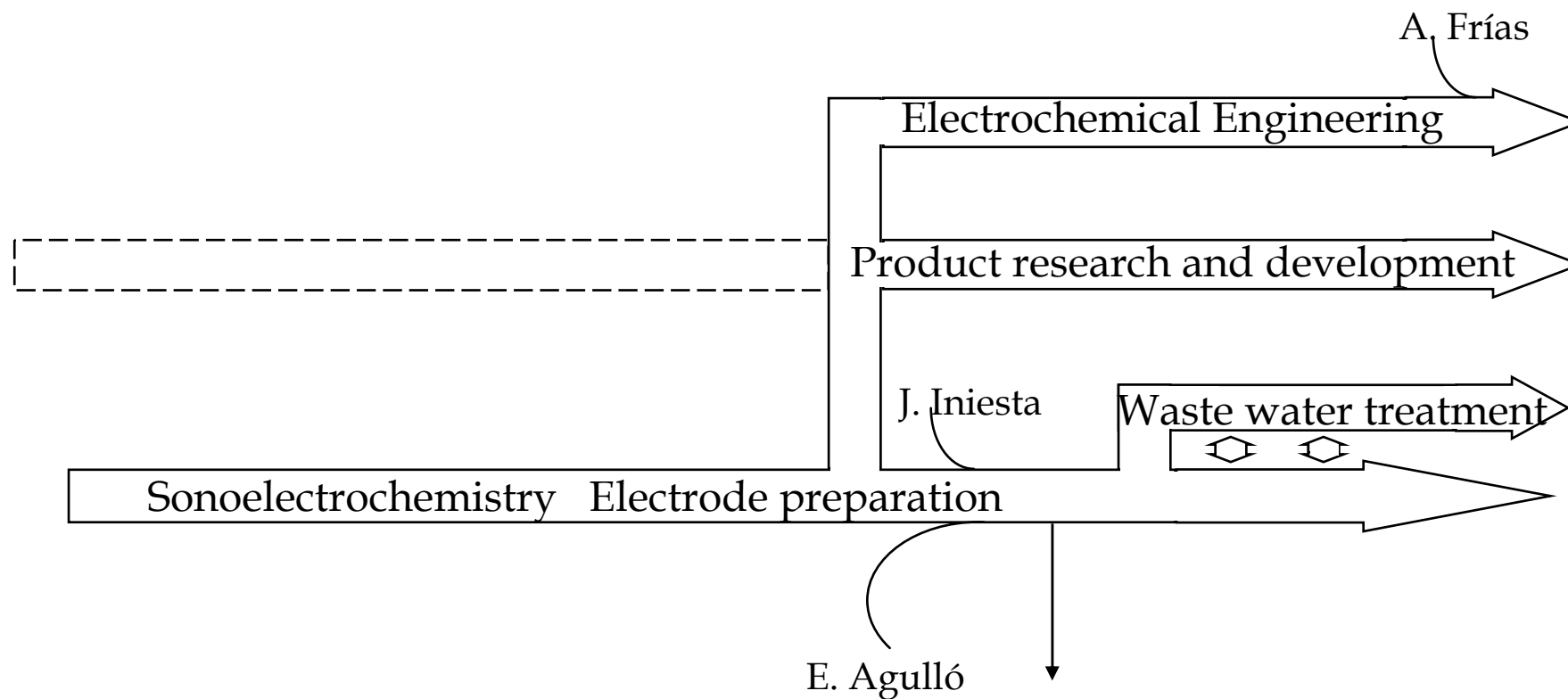
SONOELECTROCHEMISTRY. Study of C/PbO₂ and Ti/PbO₂ anodes

5. Members

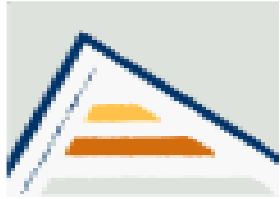
- V. Sáez
- J. Iniesta
- A. Frías-Ferrer
- J. González-García
- A. Aldaz



Grupo de Electroquímica Aplicada



DPTO. QUÍMICA FÍSICA. UNIVERSIDAD DE ALICANTE



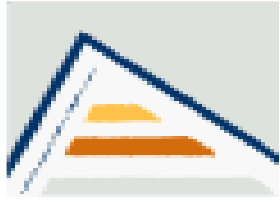
PRODUCT RESEARCH AND DEVELOPMENT. (under contract with a Industry)

1. Preliminary studies in voltammetric cell

- 1.1 Global aspect of electroodic mechanism (reversibility...)
Nature of electrode, electrolyte, pH...

2. Study in laboratory scale plant

- 2.1 Type of electrode (2d or 3D)
2.2 Type of separator
2.3 Study of operational variables (j, pH, T...)
2.4 Analysis of figures of merit ($\text{kg m}^{-2} \text{day}^{-1}$, kWh kg^{-1})



PRODUCT RESEARCH AND DEVELOPMENT. (under contract with a Industry)

3. Final study in pre-pilot and pilot plant scale

3.1 Reproducibility of results

3.2 Lifetime of the electrodes, separators

3.3 Demostration and confirmation to Industry of the viability of the process.

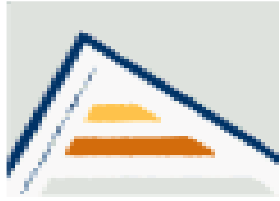
4. Specific equipment

4.1 Filter-press with electrodes of 3300 cm² unitary area

4.2 Rectifier of 30V-1000A computer controlled

4.3 Two 0.7 m³ tanks for catholite and anolyte

4.4 Auxiliary systems (pumps, data acquisition and control, etc)



PRODUCT RESEARCH AND DEVELOPMENT. (under contract with a Industry)

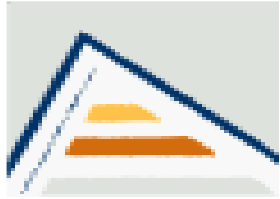
5. Examples

5.1 Form cystine to S-Carboximethyl-L-cysteine

5.2 From Homocystine to Homocysteine

6. Members

- A. Aldaz
- P. Bonete
- V. García-García
- J. González-García
- V. Montiel



ELECTROCHEMICAL ENGINEERING. Characterization of reactors

1. Filter-press reactors (from lab to pilot plant scale)

1.1. Two-dimensional electrodes

Hydrodynamic behaviour. Modelling of RTD.

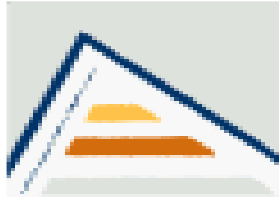
Mass transport studies. Limiting current technique.

1.2. Three-dimensional electrodes

Hydrodynamic behaviour. Modelling of RTD.

Characterization of porous materials.

Mass transport studies. Concentration decay technique.

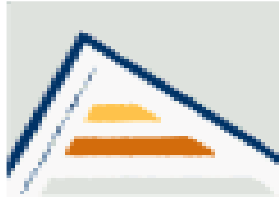


ELECTROCHEMICAL ENGINEERING. Characterization of reactors

2. Results

- José González García, PhD Thesis. Universidad de Alicante.
- *Ind. Eng. Chem. Res.* **37**, 1998, 4501.(1)
- *J. Mater. Chem.* **9**, 1999, 419.(2)
- 5th European Symposium on Electrochemical Engineering

- (1) Colaboration with Chemical Engineering Department and
- (2) Inorganic Chemistry Department of Universidad de Alicante



Grupo de Electroquímica Aplicada



ELECTROCHEMICAL ENGINEERING. Characterization of reactors

3. Members

- A. Aldaz
- V. Montiel
- A. Frías
- J. González-García

DPTO. QUÍMICA FÍSICA. UNIVERSIDAD DE ALICANTE