Postdoctoral

Ecole/Institution/Société:
Polytechnic University of Catalonia (UPC) - BarcelonaTECH, **Spain / Barcelona**

Discipline:
Mechanical Engineering

Type d'emploi::
Full-time

Date de publication:
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Personne à contacter:
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Ph.D. in Chemical Engineering, Circular Processing of Seawater Brines

The recovery of valuable minor and trace metals and minerals (M&M) for commercial purposes from salt-works brines, is an innovative potential source of resources which has been raising interest over the past few years. Between different initiatives promoted by the EC those associated to the Circular Economy Program and to the Critical Raw Materials actions are the most relevant for this project

The main benefits are clear: recovering valuable M&M that can be reintroduced into the manufacturing and industrial processing; reduce environmental impact due to the decrease of brine dumping; decrease capital and operational expenditure (CAPEX) cost of operating plants. It should be mention that the proposed should be sustained basically by reducing the external use of chemicals and energy.

The project will be focus on evaluating experimentally at lab and pilot scale the following process:

- Commercial and self-prepared ion-exchange resins and sorbents will be tested and conditions optimized to verify selective functionalities to the recovery of two main groups of elements alkaline and rare-alkaline (Rb, Cs, Sr) and transition metals (Ga, Ge and Co), and adsorption/desorption cycles will be optimized to extend the life-time. The sorption and desorption cycles should be based on pH swing, where recovery will be case on the use of strong acids and bases generated from brines of the salt-work
- Optimize the performance of ion-exchange membranes (mono-polar and bi-polar) on the production of strong acids and bases from brines by using commercial membranes ad stacks provided by the industrial partners of the project.
- Develop numerical algorithms for describing and optimizing both: i) sorption and desorption metal recovery processes from both equilibrium and kinetic data; ii) the production of strong acids and base, the products quality and the specific energy consumption.
- The project will evaluate the technical and economic feasibility based on experimental test and modeling tools developed for this purpose.
- Research topic: Circular Processing of Seawater Brines from Saltworks for Recovery of Valuable Raw Materials - SEArcularMINE project.

About

The Universitat Politècnica de Catalunya · BarcelonaTech (UPC) is a public institution of research and higher education in the fields of engineering, architecture, sciences and technology, and one of the leading technical universities in Europe. Every year, more than 6,000 bachelor's and master's

students and more than 500 doctoral students graduate. The UPC has a high graduate employment rate: 93% of its graduates are in work and 76% find a job in under three months

The UPC, an International Campus of Excellence

The UPC is an International Campus of Excellence with two projects: the Barcelona Knowledge Campus (BKC) and the Energy Campus. Through these projects, it promotes employability, social cohesion and regional economic development. It interacts with research centers, science and technology parks, businesses and other agents as a hub for attracting talent in emerging research areas. In addition, through its four UNESCO Chairs, the UPC contributes to the exchange of knowledge and fosters cooperation.

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