

# Desalination for the Environment

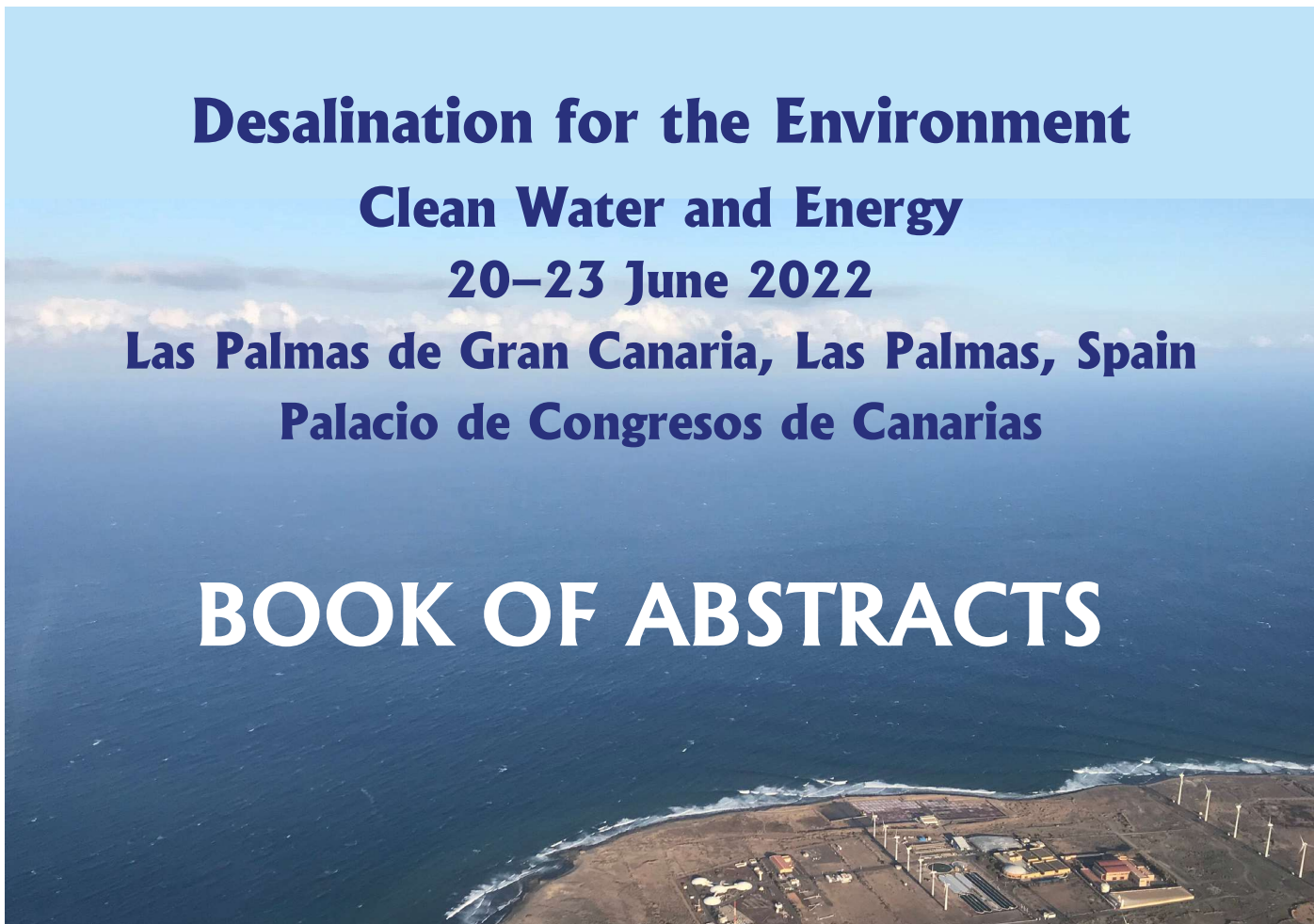
## Clean Water and Energy

20–23 June 2022

Las Palmas de Gran Canaria, Las Palmas, Spain

Palacio de Congresos de Canarias

# BOOK OF ABSTRACTS



Supported by



Platinum sponsor



المؤسسة العامة لتحلية المياه المالحة  
Saline Water Conversion Corporation (SWCC)

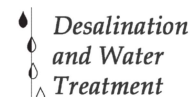
Gold sponsors



Silver sponsors



Media partners



## Potentials for critical raw materials recovery from Mediterranean saltworks bitterns

S. Randazzo<sup>a</sup>, F. Vicari<sup>b†\*</sup>, J. López<sup>c,d</sup>, M. Salem<sup>e</sup>, D. Baaklini<sup>f</sup>, S. Pawlowski<sup>g,h</sup>, S. Karayilani<sup>i</sup>,  
R. Cucchiara<sup>b</sup>, R. Lo Brutto<sup>l</sup>, S. Azzouz<sup>e</sup>, S. Chamam<sup>e</sup>, S. Cataldo<sup>l</sup>,  
M. Fernández de Labastida<sup>c,d</sup>, V. Vallès<sup>c,d</sup>, H.M. Saif<sup>g,h</sup>,  
G. Micale<sup>a</sup>, A. Tamburini<sup>a</sup>, E. Kucuk<sup>i</sup>, A. Pettignano<sup>l</sup>,  
G. D'Alì Staiti<sup>m</sup>, D. Pastorelli<sup>f</sup>, J.G. Crespo<sup>g,h</sup>,  
A. Hannachi<sup>e</sup>, J. L. Cortina<sup>c,d,n</sup>, A. Cipollina<sup>a</sup>



<sup>b</sup>Dipartimento di Ingegneria, Università di Palermo (UNIPA),  
Palermo, Italy

<sup>a</sup>ResourSEAs srl, Palermo, Italy

<sup>c</sup>Chemical Engineering Department, UPC-BarcelonaTECH, Barcelona, Spain

<sup>d</sup>Barcelona Research Center for Multiscale Science and Engineering, Barcelona, Spain

<sup>e</sup>Ecole Nationale d'Ingénieurs de Gabes, University of Gabes, Gabes, Tunisia

<sup>f</sup>Suez International, Paris, France

<sup>g</sup>BET, Instituto de Biologia Experimental e Tecnológica, Oeiras, Portugal

<sup>h</sup>LAQV-REQUIMTE, Department of Chemistry, NOVA School of Science and Technology,  
Universidade NOVA de Lisboa, 2829-516 Caparica, Portugal

<sup>i</sup>Ekodenge, Ankara, Turkey

<sup>l</sup>Dipartimento di Fisica e Chimica - Emilio Segrè, Università di Palermo (UNIPA), Palermo, Italy

<sup>m</sup>Sosalt SpA, Trapani, Italy

<sup>n</sup>Water Technology Center (CETAqua), Cornellà de Llobregat, Spain, email: fabrizio.vicari@resourceas.com

Minerals extraction from seawater brines is currently regarded as the most practical approach to reduce European dependency from the import of many Critical Raw Materials. The technical feasibility of such approach has been widely demonstrated in several different research and development projects but the economic sustainability has always been found to depend on the local demand for sodium chloride, which is always the most abundant product of the extraction.

Starting from this crucial node, the SEArcularMINE project has investigated the possibility to use the residual brines originated by sea-salt extraction in traditional saltworks, regarded as an already well-established marketplace.

The Mediterranean area as a whole, can rely on a diffused industry including South-European coast, North-African and Close East coast and portions of the Atlantic regions. Additionally, many inland salt-lakes and subsoil waters are traditionally operated in the same way as the coastal facilities to produce solar-salt. Interestingly, each saltworks have a slightly different approach, adapted to feed quality or local climate conditions.

Accordingly, different types of brine are produced, having unique features. These “bitterns” are extremely interesting to characterize, focusing on their hidden potential.

In this work, an extensive analytical campaign has been conducted exploiting the wide saltworks network established within the SEArcularMINE project. Main results are here reported, highlighting the possibility of contributing to secure the access to some Critical Raw Materials for EU.

**Keywords:** Critical raw materials; Circular economy; Brine; Minerals; Sea-salt; Saltworks

† \* Corresponding author