

# ANA BELÉN CUEVA SOLÁ

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## PROFILE

Proactive, capable of assuming challenges, enjoy team and field work, passionate about research, confident, responsible, perfectionist. I believe in clean and sustainable processes.

### Research Areas:

- Hydrometallurgy & Urban Mining
- Rare earth metals recovery from primary and secondary sources
- Sustainable Secondary Resources Innovation
- Computational Fluid Dynamics (Crystalization process using Fluent)
- Liquid-liquid extraction for clean processes
- Resources recycling

## EDUCATION

### University of Science and Technology – (South Korea)

March 2019 – February 2023

PhD in Resources Recycling. (subject of research is **Hydrometallurgy**: leaching, solvent extraction, ion exchange)

Dissertation title: Recycling of Vanadium and Tungsten from spent SCR catalyst by hydrometallurgical techniques

### Korea Advanced Institute of Science and Technology (South Korea)

September 2016 - August 2018

Master in Chemical and Biomolecular Engineering (CFD research). Minor in Business. Graduated.

Dissertation title: Study of the effect of the operational conditions on the crystal size distribution of potassium chloride crystals by numerical simulation.

### Universidad San Francisco de Quito (Ecuador)

August 2008 - December 2014

Chemical Engineering. Minor in Psychology. Graduated

## JOB EXPERIENCE

### Oak Ridge National Laboratory (Oak Ridge- United States)

May 2023 – Present

Postdoctoral Research Associate. Chemical Separations Group. Chemical Sciences Division.

Current Research: Precisely design lixiviant synthesis to selectively leach rare earth metals from monazite. Organic synthesis. Material characterization.

### Korea Institute of Geoscience and Mineral Resources KIGAM (South Korea)

March 2019 – April 2023

Researcher in the Convergence Research Center for Development of Mineral Resources (DMR).

Research: Separation of Vanadium and Tungsten from Spent SCR catalyst, Recovery of Tungsten from soft scrap & recovery and separation of rare earth materials using hydrometallurgy

### Korea Advanced Institute of Science and Technology (South Korea)

September 2016 - August 2018

Researcher. Worked in Process Analysis Laboratory using ANSYS Fluent for CFD applications.

### Universidad San Francisco de Quito (Ecuador)

August 2014 – July 2015

Coordinator in the CEPRA VII- Red farmacos project.

### Universidad San Francisco de Quito (Ecuador)

January 2014 – May 2014

Teacher Assistant in Exercises of General Chemistry (2 hours per class a week) and Exercises of Organic Chemistry (2 hours per class a week).

### Latinoamericana de Jugos S.A. (Ecuador)

January 2013 - August 2013

Anaerobic Digestion fruit waste treatment plant startup and commissioning. COD, VFA and Alkalinity chemical analysis and physical analysis of feed and product.

### Universidad San Francisco de Quito (Ecuador)

September 2010 - March 2011

Research assistant for laboratory analysis of oil-polluted soil. Determination of the amount of oil by Soxhlet extraction method and, COD and BOD analysis.

## CONFERENCES

- EARTH 2022 (Tainan-Taiwan)** October 31 2022  
 The 16th International Symposium on East Asia Resources Recycling Technology – Oral presentation  
**Abstract title:** Environmentally friendly removal of iron from an electrolytic solution rich in copper by selective hydrometallurgical routes
- TMS 2022 Annual Meeting & Exhibition (Online- International Presentation)** March 14-17, 2022  
 Rare metal extraction and processing – Oral presentation  
**Abstract title:** Novel environmentally friendly leaching process for vanadium and tungsten recovery from spent SCR catalyst
- TMS 2021 Annual Meeting & Exhibition (Online- International Presentation)** March 15-18, 2021  
 Recycling and Sustainability for Emergin Technologies and Strategic Materials Symposium – Oral presentation  
**Abstract title:** Recycling of spent SCR catalyst to recover Vanadium and Tungsten by Hydrometallurgical Routes
- EARTH 2019 (Gangwondo - South Korea)** October 17 2019  
 The 12th International Symposium on East Asia Resources Recycling Technology – Poster presentation  
**Abstract title:** Extraction of vanadium and tungsten from SCR spent catalyst leach liquor by hydrometallurgical routes
- Korean Institute of Chemical Engineers (Daejeon- South Korea)** October 25 2018  
 Fall 2017 General Meeting and Conference (한국화학공학회 2017년도 가을 총회 및 학술대회) – Oral Presentation  
**Abstract title:** Computational study of crystallization process
- ISChE 2017 (Daejeon- South Korea)** December 01 2017  
 The 30th International Symposium on Chemical Engineering – Poster Presentation  
**Abstract title:** Simulation of crystal size distribution in cooling crystallization process of potassium chloride

## DETAILS ON R&D PROJECTS

Title of The Project	Funding Agency	Duration	Role
Dissolution by Design: Selective Leaching of Rare Earth Elements Using SMART Lixiviants	Critical Materials Innovation Hub (CMI): U.S. DOE Energy Innovation	2020-2024 (On-going)	Postdoctoral Researcher
Development of environmentally sound copper production process with zero emission of SOx gas refining process for the production of high purity copper metal and commercialization technologies (KIGAM 20-9809)	National R & D Project, Ministry of Trade Industry and Energy, Seoul, Republic of Korea	2020-2024 (On-going)	PhD Researcher
Development of process for recovery and preparation of high purity valuable metal from tungsten soft scrap by alkali fusion (KIGAM 19-9895)	Global Top Environmental Technology Development Project, Sponsored by Ministry of Environment, Korea	2019-2020 (finished)	PhD Researcher
Development of technology for practical application with rare-earth mineral resources of North Korea (KIGAM 18- 8904)	Ministry of Science, ICT and Future Planning, Seoul, Republic of Korea	2015-2018 (finished)	PhD Researcher

## RESEARCH PUBLICATIONS

### Book Chapters

- 1) Novel Environmentally Friendly Leaching Process for Vanadium and Tungsten Recovery from Spent SCR Catalyst, **A. B. Cueva-Sola**, J. H. Jeon, R. K. Jyothi, J.-Y. Lee at book on “Rare Metal Technology 2022”, The Minerals, Metals & Materials Series, Springer, Cham USA, 2022 ([https://doi.org/10.1007/978-3-030-92662-5\\_11](https://doi.org/10.1007/978-3-030-92662-5_11))
- 2) Sustainable environmentally friendly approaches to the recycling of spent selective catalytic reduction (SCR) catalysts, **A. B. Cueva-Sola**, P. K. Parhi, J.-Y. Lee, R. K. Jyothi, at book on “Sustainable Nanotechnology for Environmental Remediation”, Edited by J. R. Koduru, R. R. Karri, N. M. Mubarak, E. R. Bandala, Elsevier, USA, 2022 (**ISBN: 978-0-12-824547-7**)
- 3) Introduction of Rare-Earth Metal Recovery for Green and Clean Energy Technologies, **A. B. C. Sola**, P. K. Parhi, T. Thenepalli, R. K. Jyothi at book on “Rare-Earth Metal Recovery for Green Technologies: Methods and Applications”, Springer, a part of Springer Nature by R. K. Jyothi, 2020 (**ISBN: 978-3-030-38105-9**)

- 4) Ionic liquids for the recovery of rare earth elements from coal combustion products, I. K. Danso, **A. B. Cueva-Sola**, Z. Masaud, J. Lee and R. K. Jyothi\*, at book on “Clean Coal Technologies: Utilization, Transport Phenomena, Mineral Beneficiation and Prospective”, Volume I Edited by P. K. Parhi & R. K. Jyothi, Springer, a part of Springer Nature, 2021. (ISBN: 978-3-030-68502- 7)

### Research Articles

- 1) Review on lithium ion battery recycling in India: challenges and possibilities, **A. B. Cueva-Sola**, N. Panda, T. Thenepalli, R. K. Jyothi\*, **Geosystem Engineering (2023)**, 1-18
- 2) Separation of vanadium and tungsten from synthetic and spent catalyst leach solutions using an ion-exchange resin, J. H. Jeon, **A. B. Cueva-Sola**, J-Y. Lee, J.R. Koduru, R. K. Jyothi\*, **RSC Advances, 12 (2022)** 3635-3645.
- 3) Development of a recovery process for rare earths and thorium from Korean monazite, J. H. Jeon, **A. B. Cueva-Sola**, G.B Park, H.I. Kim, J-Y. Lee, R. K. Jyothi\*, **Geosystem Engineering (2022)**, 1-7
- 4) Hydrometallurgical process development to recycle valuable metals from spent SCR deNOX catalyst, J. H. Jeon, **A. B. Cueva-Sola**, J-Y. Lee, R. K. Jyothi\*, **Scientific Reports, 11 (2021)** 22131.
- 5) Environmentally friendly approach to recover vanadium and tungsten from spent SCR catalyst leach liquors by Aliquat 336, **A. B. C. Sola**, P. K. Parhi, J.-Y. Lee\*, H. N. Kang, R. K. Jyothi\*, **RSC Advances, 10 (2020)** 19736-19746.
- 6) Spent SCR Catalyst Leach Liquor Processed for Valuable Metals Extraction by Solvent Extraction Technique, **A. B. C. Sola**, J. H. Jeon, J-Y. Lee, P. K. Parhi, R. K. Jyothi\*, **Journal of the Korean Institute of Resources Recycling, 29 (2020)** 55-61.

### Research Articles submitted

- 1) Circular economy approach: Sustainable solution to the recycling of spent SCR catalyst and its prospective gas sensor application, **A. B. Cueva-Sola**, J. H. Jeon, J-Y. Lee, R. K. Jyothi\*, **Materials Today Sustainability. IN REVIEW**

## CERTIFICATES & AWARDS

### Language Qualifications

- 1) **Spanish** as a native speaker
- 2) **English** professional proficiency (TOEFL IBT 111/120)
- 3) **Korean** intermediate-advanced level (TOPIK 4/6)

### Awards Received

- 1) Dimitri Mendeleev Chemical Engineering full Scholarship, **Universidad San Francisco de Quito, Ecuador**, 2008-2014
- 2) Korean Government Scholarship for Master’s studies at KAIST, **Ministry of International Education South Korea**, 2015-2018
- 3) University of Science and Technology at KIGAM School full Scholarship, **PhD course in South Korea**, 2019-2023
- 4) University of Science and Technology, **UST International Presentation Support Program to attend TMS online 2021**, 2021
- 5) University of Science and Technology, **UST International Presentation Support Program to attend EARTH 2022, Taiwan**, 2022