

RESEARCH TEAM FOR SUSTAINABLE PRODUCTION IN CANTABRIA

2015 ACTIVITY





**Department of Chemical and
Biomolecular Engineering
(SPAIN)**



**Sustainable Production in Cantabria
Department of Chemical and Biomolecular Engineering**

**ETSIIyT, Universidad de Cantabria
Av. Los Castros s/n 39005 - Santander - Cantabria
Spain**

Tel.: +34 942 201585 / FAX: +34 942 201591



SOSPROCAN TEAM



SOSPROCAN team

The **SOSPROCAN team** hosts 60 researchers of the University of Cantabria with background in the analysis, design and optimization of environmental and production processes.

The mission of this team is to develop cutting-edge research to advance the sustainability and innovation of environmental and production processes.

The members of SOSPROCAN team belong to four research groups:

DePRO
Development of
Environmental and
Production Processes

PAS
Advanced Separation
Processes

TAB
Environmental
Technologies and
Bioprocesses

IPS
Sustainable Processes
Engineering



<http://www.unican.es/Departamentos/ingquimica/>
<http://grupos.unican.es/pasep/>
<http://grupos.unican.es/depro/>



<https://www.facebook.com/IngenieriaQuimicayBiomolecular>

HUMAN RESOURCES



HEAD OF RESEARCH GROUPS



Prof. Angel Irabien
Head of the research group
DEPRO
irabienj@unican.es



Prof. Inmaculada Ortiz
Head of the research group
PAS
ortizi@unican.es



Prof. Ane M. Urtiaga
Head of the research group
TAB
urtiaga@unican.es



Dr. Raquel Ibáñez
Head of the research group
IPS
ibanezr@unican.es

ASSOCIATE PROFESSORS



Rubén Aldaco
aldacor@unican.es



Ignacio Fernández
fernandi@unican.es



Aurora Garea
gareaa@unican.es



Daniel Gorri
gorrie@unican.es



María José Rivero
riveromj@unican.es



María Fresnedo San Román
sanromm@unican.es

ASSISTANT PROFESSORS, PhD



Manuel Álvarez

alvarezgm@unican.es



Enrique Álvarez

alvarezge@unican.es



Eugenio Bringas

bringase@unican.es



Nazely Diban

dibann@unican.es



Antonio Dominguez

domingueza@unican.es



Marcos Fallanza

fallanzam@unican.es



María Margallo

margallom@unican.es



Alfredo Ortiz

ortizal@unican.es



Gabriel Zarca

zarcag@unican.es

PART TIME PROFESSORS



Julián Díaz

diazju@unican.es



Jose Antonio Fernández

fernandezfja@unican.es



Pedro Manuel Gómez

gomezrp@unican.es



Axel Arruti

arrutia@unican.es



Javier Pinedo

pinedoj@unican.es



Henar Samaniego

samaniegoh@unican.es

POST-DOC RESEARCHERS



Clara Casado
casadoc@unican.es



Olalla Iglesias
iglesiaso@unican.es



Ricardo Abejón
abejonr@unican.es



Esther Santos
santosse@unican.es

TECHNICAL STAFF



Beatriz Arce
arceb@unican.es



Sonia Gómez
gomez@sunican.es



Gema Pérez
perezg@unican.es



Oscar Primo
primoo@unican.es

PhD STUDENTS



Azucena Abejón
abejona@unican.es



Arantza Basauri
basauria@unican.es



Andrés del Castillo
castilloa@unican.es



Selene Cobo
castilloa@unican.es



Mariana Díaz
diazvm@unican.es



Sara Domínguez
dominguezs@unican.es



Carlos Javier Escudero
Carlos-javier.escudero@alumnos.unican.es



Ana Fernández
fbarquina@unican.es



Pablo Fernández
fcastrop@unican.es



Carolina Fernández
fernandezgoc@unican.es



Isabel García
garciahmi@unican.es



Lucía Gómez
gomezcomal@unican.es



Jenifer Gómez
gomezjp@unican.es



Beatriz Gómez
gomezrb@unican.es



Ana María Hernández
hernandezam@unican.es

PhD STUDENTS



Marta Herrero

herrerogma@unican.es



Jara Laso

lasoj@unican.es



Juan Martínez

martinezpj@unican.es



Iván Merino

merinoi@unican.es



Adham Norkobilov

adham.norkobilov@alumnos.unican.es



Isabel Ortiz

ortizgi@unican.es



Paula Ribao

ribaop@unican.es



Sandra Sánchez

sanchezgs@unican.es



Claudia Solá

solac@unican.es



Álvaro Soriano

sorianoa@unican.es



Germán Santos

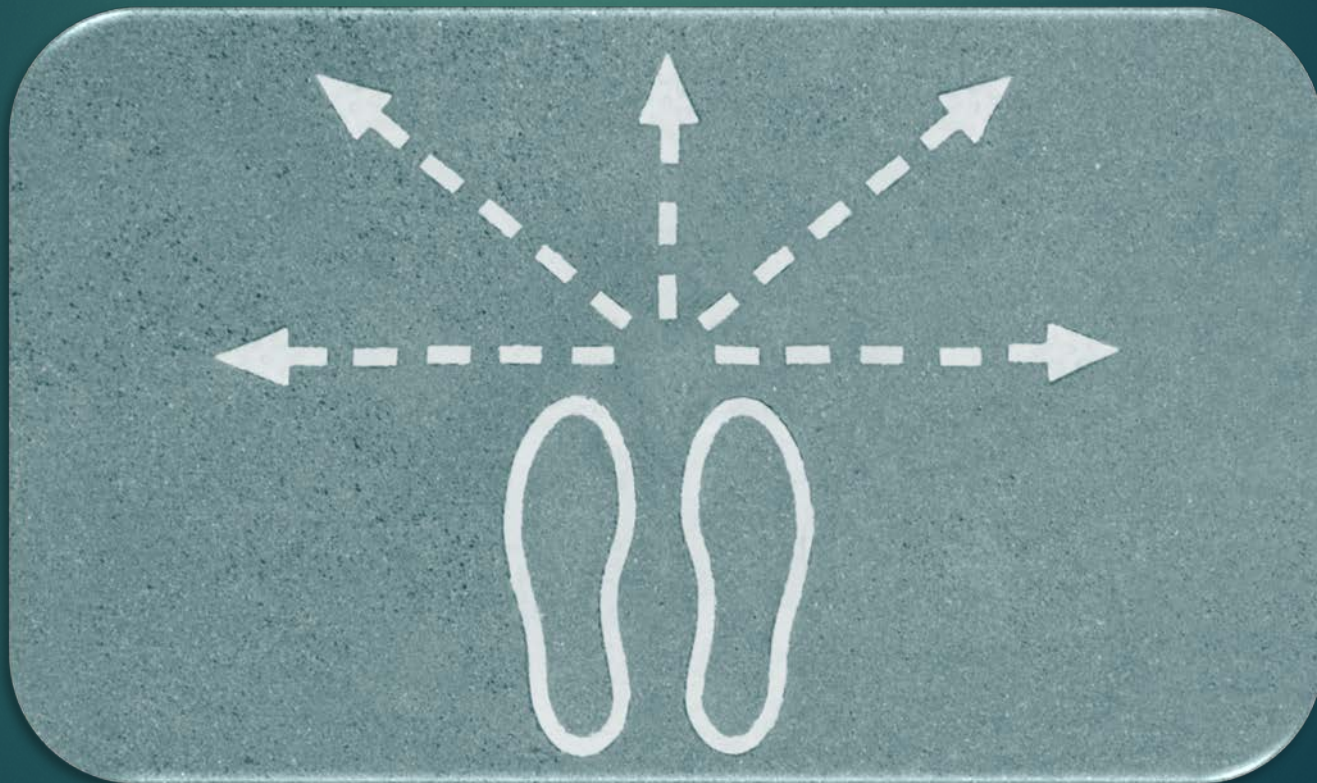
santosg@unican.es



Raúl Zarca

zarcar@unican.es

RESEARCH TOPICS



Research Topics

Sosprocan
Unidad de Sostenibilidad de
la Producción de Cantabria

Sosprocan
DePRO
Desarrollo de Procesos Químicos
y Control de Contaminantes

Sosprocan
SPAS
Procesos Avanzados de
Separación

Sosprocan
TAB
Tecnologías Ambientales y
Bioprocesos

Sosprocan
SIPS
Ingeniería de Procesos
Sostenibles



TRANSFER OF KNOWLEDGE



Transfer of Knowledge - Academy

✓ 2nd Edition - Official Master in Chemical Engineering

The Official Master in Chemical Engineering is jointly taught with the University of the Basque Country promoting an excellent training program with highly specialized Academics. The degree follows the previous editions of the Master in Chemical Engineering “SustainAble Production and Consumption” of the University of Cantabria and the Master in Chemical Process Engineering and Sustainable Development of the University of the Basque Country, both taught since 2007.

The master endorses the guidelines recorded in **BOE A-2009-12977**, June 8th, 2009.

✓ Doctoral Studies in Chemical and Process Engineering

Preliminary Excellence Award MEE2011-0031

- Positive Evaluation of the Doctorate Studies by the Spanish “Consejo de Coordinación Universitaria, October 5th, 2009.

✓ International Academic Exchange Socrates-Erasmus Programmes.



Másteres Oficiales de la Universidad de Cantabria



Máster Universitario en Ingeniería Química

Es un Máster Oficial Interuniversitario entre la Universidad de Cantabria (UC) y la Universidad del País Vasco (UPV/EHU) que se imparte por primera vez el curso 2014-2015 y surge como continuidad del Máster en Ingeniería Química “Producción y Consumo Sostenible” de la Universidad de Cantabria y del Máster en Ingeniería de Procesos Químicos y Desarrollo Sostenible de la UPV/EHU, ambos impartidos desde 2007. El Máster en Ingeniería Química recoge las directrices de la resolución de 8 de junio de 2009 de la Secretaría General de Universidades acerca de la Profesión del Ingeniero Químico.

Información
Área de conocimiento: Ingeniería y Arquitectura
Lugar de impartición: UC y UPV/EHU
Instituciones participantes: UC y UPV/EHU
Duración: 1,5 cursos académicos (3 cuatrimestres)
90 créditos ECTS 60 ETCS teóricos 30 ETCS prácticos (incluyendo el Trabajo Fin de Máster)
Idioma: Español
Tipo de docencia: 100% presencial
Doctorados de la Universidad de Cantabria a los que da acceso: - Programa de Doctorado en Ingeniería Química, de la Energía y de Procesos
Precio matrícula (curso 2013-2014): Se impartirá por primera vez en el curso 2014-15
Contacto: etsit@unican.es gestion.academica@unican.es

Finalidad
El objetivo fundamental del Máster en Ingeniería Química es formar profesionales que sean capaces de aplicar métodos científicos y técnicos para plantear y resolver problemas de investigación, desarrollo y aplicación industrial en el campo de la industria química y de procesos. También podrán desarrollar su actividad en el campo de la investigación ya que una vez cursado este Máster podrán acceder al Programa de Doctorado en Ingeniería Química, de la Energía y de Procesos de la UC, o a su equivalente en la UPV-EHU.

Perfil del alumnado
El perfil de ingreso idóneo de los estudiantes del presente Máster es el de aquellos alumnos que acrediten las competencias correspondientes al Grado de Ingeniería Química. Corresponden a estas competencias los Graduados en Ingeniería Química o Graduados en Ingeniería Química Industrial, los Titulados en Ingeniería Química, así como los titulados en Ingeniería Industrial (especialidad de Química Industrial) o titulados en Ingeniería Técnica Industrial (especialidad de Química Industrial).

Para el resto de las titulaciones la Comisión Académica del Máster estudiará cada caso particular y propondrá la realización de complementos formativos.

Salidas profesionales
El Ingeniero Químico es un profesional versátil, capacitado para trabajar en gran variedad de sectores industriales, de servicios y Administración, y desempeñar muy diversas funciones profesio-

nales. La sociedad actual demanda este tipo de profesionales con una formación específica en Ingeniería Química, capacitados para desarrollar, mejorar y optimizar procesos, operar plantas de producción, etc., en la Industria Química y de Procesos. Algunas de las áreas para desarrollar su labor profesional serían: diseño e ingeniería de proceso, producción e ingeniería de producto, I+D+i, gerencia y dirección, o ventas y marketing.



<http://www.unican.es/Centros/etsit/postgrado/Master+IQ.htm>

Transfer of Knowledge: Advanced Seminar

“Tratamientos avanzados de oxidación electro-Fenton para la descontaminación de sedimentos marinos y efluentes contaminados”

Dra. Olalla Iglesias Castrillejo – Investigadora Postdoctoral del Dpto. de Ingenierías Química y Biomolecular (UC)



“Innovations in polymers and materials chemistry via application on ionic liquids as solvents, catalysts, monomers and electrolytes”

Dr. Alexander S. Shaplov, Laboratory of High Molecular Compounds A.N. Nesmeyanov Institute of Organoelement compounds, Russian Academy of Sciences (INEOS RAS)

“Rol del Ingeniero Químico en la formación de nuevas generaciones de ingenieros químicos desde CIQB – CIIQ-CEIQ-CAIQ-CMIQ 2015 – 2017”

Ing. Quim. Zhuzhell Rejas, presidente del Colegio de Ingenieros Químicos de Bolivia (CIQB)



Transfer of Knowledge: Advanced Seminar

“Synthesis and characterization of membranes based on protic plastic crystal and polymers for fuel cell applications”

Ms. Mariana Díaz Vejo, estudiante del Programa de Doctorado en Ingeniería Química y de Procesos, Dpto. Ingenierías Química y Biomolecular (UC)



“MefCO2. Nuevas vías para la reutilización de CO₂”

Mr. David Cuesta Pardo, Manager I-deals (EVERIS GROUP).



“Towards sustainable carbón capture and utilisation (CCU) technologies”

Dra. Rosa Cuellar-Franca, Lecturer in Sustainable Chemical Engineering en la School of Chemical Engineering and Analytical Science, University of Manchester.

Transfer of Knowledge: Invited Lectures

May 16th, 2015

¿Cómo se puede satisfacer la necesidad de agua en el siglo XXI? El papel de la Ciencia y la Tecnología.

By Prof. Inmaculada Ortiz

Club Prensa Asturiana, organized by Academy of Exact, Physical and Natural Sciences and University of Oviedo.



December 10th, 2015

Cambio Climático, ¿qué hacer?

By Prof. Ángel Irabien

Organized by Asociación para la Defensa de los Recursos Naturales de Cantabria (ARCA) Santander

October 28th, 2015

Membrane technology for recovery of desalination brine

By Dr. Raquel Ibáñez

2nd Membrane Technology Conference organized by the Spanish Desalination and Water Reuse Association



Transfer of Knowledge: Invited Lectures

December, 2015

Procesos Avanzados de Separación: De los fundamentos a las aplicaciones

By Prof. Inmaculada Ortiz

Organized by Chemical Engineering Doctorate Program
– University of Sevilla



December, 2015

Doctorado en Desarrollo de Procesos Químicos y Control de Contaminantes”

By Prof. Ángel Irabien

Organized by Chemical Engineering Doctorate Program
– University of Sevilla

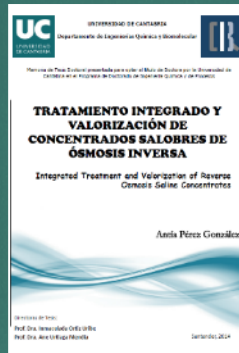


Transfer of Knowledge: Doctorate Thesis

February 13th, 2015

Antía Pérez's PhD Dissertation: "Integrated treatment and valorization of reverse osmosis saline concentrates".

Supervisors: Prof. Inmaculada Ortiz and Prof. Ane Urriaga



May 22nd, 2015

Juan Saiz's PhD Dissertation: "Design of functionalized magnetic nanoadsorbents for the removal of arsenic from polluted groundwater".

Supervisors: Prof. Inmaculada Ortiz and Dr. Eugenio Bringas



December 18th, 2015

Isabel García's PhD Dissertation: "Development of an innovative process for CO₂ valorization: organic carbonates electrosynthesis using ionic liquids".

Supervisors: Prof. Ángel Irabien and Dr. Manuel Álvarez



Transfer of Knowledge: Internships

2014 – 2015

Students of the Chemical Engineering Degree and of the Master in Chemical Engineering have **done internships in several industrial companies** during the academic year 2014 – 2015.



Pablo Arruti
Dynasol Elastómeros (Repsol Group)
Supervisors: Mr. Luis Sánchez (Dynasol)
and Dr. Ane Urtiaga (UC)



Pablo Herrero
Solvay Torrelavega
Supervisors: Dr. Salvador Asensio
(Solvay) and Dr. Alfredo Ortiz (UC)



María del Mar Hervella
Nestlé España – Fábrica de la Penilla
Supervisors: Ms. Isabel Pellón (Nestlé) and Dr.
Nazely Diban (UC)



Amador Cláver
Nestlé España – Fábrica de la Penilla
Supervisors: Mr. Miguel Ruiz (Nestlé)
and Dr. María José Rivero (UC)

Transfer of Knowledge: Internships



Marta Basoa
Nestlé España – Fábrica de la Penilla
Supervisors: Mr. Miguel Ruiz (Nestlé) and
Dr. Raquel Ibáñez(UC)



Marta Herrero
Apria Systems
Supervisors: Dr. Pedro Gómez
(APRIA) and Dr. Axel Arruti (UC)



Alba Romano
Cargill - Belgium
Supervisors: Ms. Concepción Lera
(Cargill) and Dr. Raquel Ibáñez (UC)



Sergio Carro
ASPLA Torrelavega
Supervisors: Mr. Luis Cuartas
(ASPLA) and Dr. Raquel Ibáñez
and Dr. María José Rivero(UC)

Transfer of Knowledge: Events

Saint Thomas Aquinas´ Day, January 28th, 2015

During the ceremony of celebration of the feast of **St. Thomas Aquinas** took place the nomination of Enrique Álvarez, Javier Pinedo, Esther Santos, Virginia Valiño and Marta Vallejo as **Doctors of the University of Cantabria**.



UC
UNIVERSIDAD
DE CANTABRIA



Transfer of Knowledge: Events

May, 2015

Students of the Chemical Engineering Degree enjoyed an academic visits to **Vuelta Ostrera Wastewater Treatment Plant** and **Lunagua Ltd, and Nestlé.**

The students had the opportunity to understand in-situ how the conventional and advanced technologies for urban and industrial wastewater treatment are applied at real scale and discuss with the process engineers working at the facilities different aspects related to the treatment processes.



Transfer of Knowledge: Events

April 15th, 2015

Conference: **Innovation and Inspiring Business**

By: Mr. Óscar Santa Coloma Manager of Business Development and Environment of Tecnalia

Organized by: Student Chapter of AIChE



Conferencia
"Innovation and Inspiring Business"



Ponente: Óscar Santa Coloma,
Director de Desarrollo de Negocio de
Medio Ambiente de Tecnalia
Fecha: 15 de Abril
Hora: 13:30
Lugar: Aula 08, ETSIIT



Transfer of Knowledge: Events

June 1st, 2015

Three members of the company **Daikin Chemicals** visited the Department of Chemical and Biomolecular Engineering of the UC, with the aim of exploring possibilities of collaboration between both organisms. The picture shows an instant of the working session with the presence of Mr. Nakamura, PhD, Mr. Gaël Marseille and Mr. Masaki Irie, together with Prof. Ane Urtiaga, Mrs. Sonia Gomez, PhD, and Prof. Daniel Gorri.



Transfer of Knowledge: Events

February 27th, 2015

The School of Engineering welcomed the regional level “**Chemistry Olympiad for Secondary School Students**”, organized by the Association of Chemistry and Chemical Engineering of Cantabria (AQUIQÁN). Students of Cantabrian secondary schools took part in the competition. During the afternoon the students had the opportunity to demonstrate their knowledge.

The winners of the gold, silver and bronze medal were Jorge Bedia Cadelo (IES Valle de Camargo, Revilla de Camargo), Andrés Ramos Valle (IES Leonardo Torres Quevedo, Santander) and Juan Carlos Cordero Vázquez (IES Marqués de Santillana, Torrelavega) respectively. They were promoted to the national stage, held in Madrid on April 18th, 2015. The finalists in the national phase were able to access the international Olympiads, the 47th International Chemistry Olympiad, held in Baku (Azerbaijan) in July and to the Iberoamerican Chemistry Olimpiad, held in Brasil.

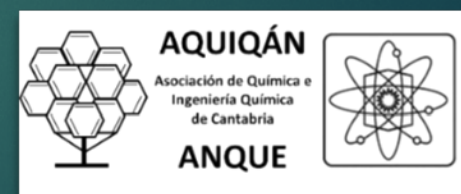


Transfer of Knowledge: Events

May 8th, 2015

I Edition of the “**Chemistry Mini-Olympiad for Secondary School Students**”, organized by the Association of Chemistry and Chemical Engineering of Cantabria (AQUIQÁN) in collaboration with the Cantabria Territorial Section of the Royal Society of Chemistry (RSEQ). 32 students of 3rd and 4th ESO level took part in the competition, where they had to solve test questions and two problems.

The winners of the gold, silver and bronze medal for 4th ESO level were Pablo García, Mario Hernando and Ivan Corrales, all of them from the IES Jose María Pereda, Santander. And for 3rd ESO level were Francisco Vallejo (IES Valle de Camargo, Revilla de Camargo), David Ignacio Alcántara (IES Marqués de Santillana, Torrelavega) and María Mencía (San Agustín School, Santander).



Transfer of Knowledge: Events

June, 2015

Members of the Chemical and Biomolecular Engineering Department visit the Company IONISOS Iberica, located in Tarancón (Cuenca, Spain). During the visit, they had the opportunity of using the high energy electron generator, in the frame of the industrial doctorate programme, developed by Juan Andrés Álvarez, in the field of the development of high performance plastics.



The picture shows an instant of the visit with the presence of Prof. Ane Urriaga, Mr. Juan Andrés Álvarez and Ms. Rosario Benavente.



Transfer of Knowledge: Events

June, 2015

The project **Development and characterization of crosslinked multilayer extruded polymeric films means of ionizing radiation** (PI: Dr. Ane Urtiaga) is funded by the call **Industrial Doctorates of the University of Cantabria**.

This project, performed by the Department of Chemical and Biomolecular Engineering of the UC in collaboration with the company Armando Alvarez S.A., is aimed at the doctoral formation of D. Juan Andrés Alvarez Ballesteros, who will investigate in high-priority fields within the activities of the company.



Departamento de
Ingenierías
Química y
Biomolecular

Transfer of Knowledge: Events

June 21-26th, 2015

Juan Martínez and Raúl Zarca, students of the Master's Degree in Chemical Engineering (UC-UPV/EHU), attend the **XXXII Summer School 2015**, organized by the European Membrane Society. The event took place at the Membrane Innovative Center in Liberec, Czech Republic.



Transfer of Knowledge: Events

June 30th, 2015

Dr. Esther Santos, on behalf of DEPRO research group attended a workshop on hazardous waste management organized by the European Commission. The discussion of the workshop was aimed at the topics:

- *"Study to develop a guidance document on the definition and classification of waste"*
- *"Study to improve hazardous waste management based on an assessment of Member States' performance"*



Transfer of Knowledge: Events

July 9th and 29th, 2015

The members of the research groups PAS and DEPRO organized two seminars where they had the opportunity to show and discuss the progress of the research and plan future work.



Transfer of Knowledge: Events

July 22nd, 2015

During the XXXV Biannual Meeting of the Spanish Royal Society of Chemistry 2015 celebrated in La Coruña (Spain), took place the **Annual Meeting of the Specialized Group of Chemical Engineering at the RSEQ**, whose president is Prof. Ángel Irabien and the secretary is Esther Santos, both of them members of the Chemical and Biomolecular Engineering Department, and the **Meeting of the Thematic Network: Sustainable Chemical Valorization of Carbon Dioxide**. This thematic network is composed of 5 research groups of UC, UA, UPV/EHU, UAM and UCM, and the main researcher is Prof. Angel Irabien and the coordinator is Dr. Esther Santos.



More info about the network: <http://www.valco2.unican.es>



Transfer of Knowledge: Events

July 22nd, 2015 and October 28th, 2015

The first students of the Master in Chemical Engineering (UC-UPV/EHU) defended their master thesis. The defenses were held in the Conference Room of the ETSIIT, University of Cantabria, and the evaluation committee was constituted by Prof. Ane Urtiaga, from the University of Cantabria, and Fernando Varona and Pedro Castaño, from the University of País Vasco.



Transfer of Knowledge: Events

July 23th, 2015

Students of the **European Project Semester (EPS)** programme, last year of the Degree in Chemical Engineering, presented their **Final Degree Projects**.

The evaluation committee was constituted by Dr. Alfredo Ortiz, Dr. Clara Casado and Dr. Enrique Álvarez.



Transfer of Knowledge: Events

July 28th, 2015

The Association of Chemistry and Chemical Engineering of Cantabria (**AQUIQÁN**) elected the members of the new Advisory Board and the assembly of ANQUE.

The elected members are:

President: Mr. Ángel Irabien

Vice-president: Mr. Manuel Álvarez

Secretary: Mr. Gabriel Zarca

Deputy-secretary: Ms. Gema Pérez

Assemblyman: Mr. Manuel Álvarez

Chairs:

Student Association: Ms. Lucía Gomez and Mr. Ignacio Nilo Ruiz

Education: Mr. Jose María Colina

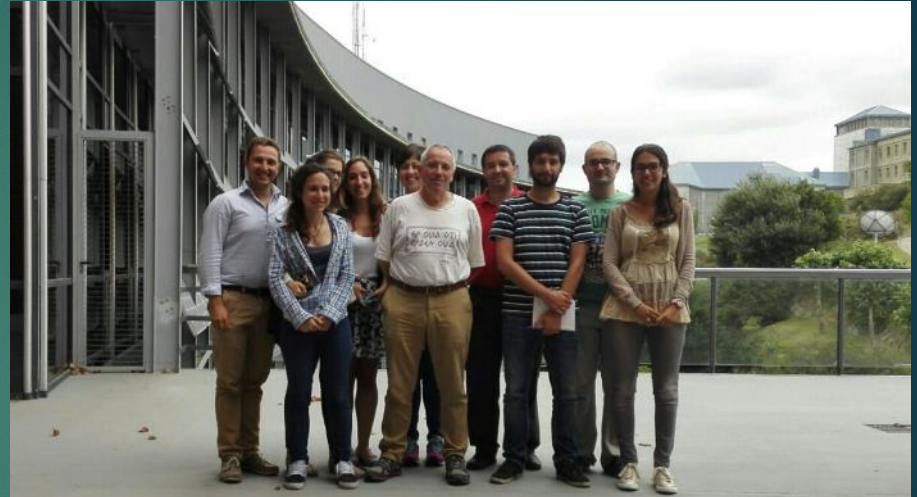
Industry and consultancy: Mr. Antonio Domínguez and Mr. Pedro M. Gómez

Administration: Mr. Julián Díaz

Communication and external relations: Ms. Clara Casado

Chemical Engineering: Mr. Andrés del Castillo and Ms. Jenifer Gómez

Chair: Mr. Enrique Álvarez



Transfer of Knowledge: Events

October 2nd, 2015

The Department of Chemical and Biomolecular Engineering was represented by Prof. Ane Urtiaga in the **Academic Ceremony in Honor to Professor Miguel Angel Galan**, that was organized to distinguish his academic career in the moment of his retirement. The ceremony was held in the Paraninfo of the University of Salamanca (Spain) in the presence of the Rector of the University of Salamanca.



Transfer of Knowledge: Events

October 2nd, 2015

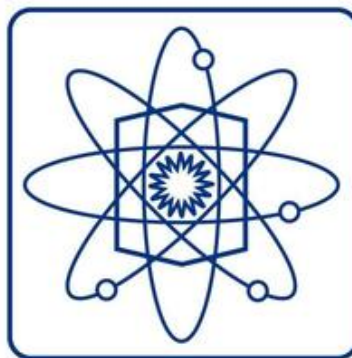
Dr. Raquel Ibañez was part of the evaluation committee of the doctoral thesis of Mr. Iñaki Urruzola Irazusta, entitled "*Elaboración de un sistema de nanofiltración a base de material lignocelulosido*", supervised by Dr. Jalel Labidi and Dr. M^a Angeles Andrés. The thesis was defended in the Department of Chemical and Environmental Engineering of the University of the Basque Country. The evaluation committee was also composed by Prof. Dr. Francisco López Baldovin (Univ. Huelva), Prof. Dr. Marino Navazo Muñoz (Univ. Pais Vasco), Dr. Luis Serrano Cantador (Univ. Grenoble INP), and Dr. María González Alriols (Univ. Pais Vasco).



Transfer of Knowledge: Events

October 9-10th, 2015

Manuel Álvarez and Gabriel Zarca, Vice-president and Secretary of the Association of Chemistry and Chemical Engineering of Cantabria (AQUIQÁN), on behalf of AQUIQÁN, participated in the LXV General Assembly of the National Association of Chemists of Spain (ANQUE), at the Polytechnic University of Cartagena (Murcia, Spain).



ANQUE
ASOCIACIÓN NACIONAL DE
QUÍMICOS DE ESPAÑA

Transfer of Knowledge: Events

October 16-17th, 2015

Dr. Raquel Ibáñez attends the **Water For Health EU-India STI Cooperation Days 2015**, which was held in Rome, where she presented the main results of the GreenTech Project.



Transfer of Knowledge: Events

November 12th, 2015

14 students received their Diplomas awarding their successful completion of the **European Project Semester (EPS)** in Chemical Engineering at the University of Cantabria in the academic year 2014/2015.

The ceremony was organized by Prof. Inmaculada Ortiz, the academic coordinator of the EPS program.

Twelve of these students were regular students of the Chemical Engineering Degree at the University of Cantabria, while the rest of them came from Cracow University of Technology (Poland) and Université de Lorraine (France).



Transfer of Knowledge: Events

November 17th, 2015

The University of Cantabria and ENSA, Equipos Nucleares S.A., celebrated a meeting in the facilities of the Company in Maliaño (Cantabria), aimed to discuss new research proposals and future cooperation, including the formation of consortiums for research proposals in the framework of the European H2020 program.

The delegates representing the University of Cantabria were the Rector, D. Jose Carlos Gómez-Sal, the Vice-Rector of Research and Knowledge Transfer, D. Angel Pazos, D. José Luis Arce and D. Juan José San Miguel. The Department of Chemical and Biomolecular Engineering was represented by Dr. Raquel Ibáñez, Dr. Antonio Domínguez and Dr. Alfredo Ortiz.



Transfer of Knowledge: Events

November 21st, 2015

The Graduation ceremony for Graduates and Masters in Chemical Engineering took place in the Paraninfo of the University of Cantabria. 28 new Graduates and 8 Masters received their diplomas awarding the completion of their studies during the academic year 2014-2015.

Our former students were accompanied by Dr. Raquel Ibañez, Vice-Dean in charge of Chemical Engineering studies in the School of Engineering of the UC.



Transfer of Knowledge: Events

November 25th, 2015

The University of Cantabria participated in the dissemination session organized by CEOE-CEPYME Cantabria with the topic “Innovation, Transfer of Technology and Knowledge”.

CEOE-CEPYME is the association of Small and Medium enterprises in the Cantabria Region. The session was aimed at the promotion of collaboration between SMEs and the University of Cantabria.

The Department of Chemical and Biomolecular Engineering was invited to present examples of its experiences in the research collaboration with SMEs. The two case studies dealt with the research contracts performed with the companies Lunagua-TRADEBE and SADER and the research groups Environmental Technologies and Bioprocesses and DEPRO, respectively. Prof. Ane Urtiaga and Dr. Maria Margallo presented previous collaboration projects to the audience.




<http://web.unican.es/noticias/Paginas/2015/noviembre/La-UC-participa-en-una-jornada-de-apoyo-a-Pymes-y-Micropymes-organizada-por-CEOE-CEPYME-Cantabria.aspx>

Transfer of Knowledge: Events

November 25th, 2015

The Department of Chemical and Biomolecular Engineering participates in the **Global ImasT meeting**, where companies, research centers and Spanish universities get connected simultaneously.

The main objective of the meeting is to promote an environment specialized in technology transfer. Our members had the opportunity to show a video with the research activity carried out in our Department.

The logo for the Global ImasT meeting is displayed within a white rectangular frame with a thick black border. The word "Global" is written in a large, black, sans-serif font. Below it, the word "ImasT" is written in a smaller, black, sans-serif font, with the letters "I" and "T" highlighted in red.

Global
ImasT

Transfer of Knowledge: Events

December 11th, 2015

Prof. Ane Urtiaga was one of the reporting members of the academic jury that evaluated the doctoral thesis “Tertiary treatment combining nanofiltration and electrochemical oxidation for elimination of pharmaceuticals in wastewater”, defended by the candidate Ms. Yandi Lan in the Laboratoire de Génie Chimique of Université Toulouse III – Paul Sabatier (France). The thesis was reported by Prof. Ane Urtiaga (Universidad de Cantabria) and Prof. Marc Cretin (Université de Montpellier 2). The jury was completed by Dr. Murielle Rabiller-Baudry (Université de Rennes) and Dr. Matthieu Jacob (Recherche Total), and the supervisors of the thesis Dr. Christel Causserand-Alexandrovich, Dr. Karine Groenen-Serrano and Dr. Coetsier Clémence.



Transfer of Knowledge: Events

December 21st, 2015

The Student Chapter of AICHE of the University of Cantabria organices a charity market.



OXFAM Intermón



ESTA NAVIDAD REGALA SOLIDARIDAD



REGALOS QUE LLEGAN EL DOBLE DE LEJOS Y MEJORAN MILES DE VIDAS.

COLABORA:



VENTA NAVIDEÑA
LUGAR: HALL DE ETSIIT
FECHA: 21.DIC, 10:30-14:30

Transfer of Knowledge: Events

Dissemination Workshop

A dissemination workshop aimed at high school students was organized by the Department of Chemical and Biomolecular Engineering. Under the slogan “Encuentros con la Ingeniería Química” this activity provides students with practical information about Chemical Engineering, including their employment sectors, both in the region and around the world. Moreover, it is an opportunity to introduce students to the Chemical Engineering degree offered at the University of Cantabria.



R + D



Research mobility of post-graduate students.



Mariana Díaz
Institute for Frontier Materials
University of Deakin
Melbourne, Australia



Carolina Fernández
Georgia Institute of Technology
School of Civil and Environmental
Technology
Atlanta, USA

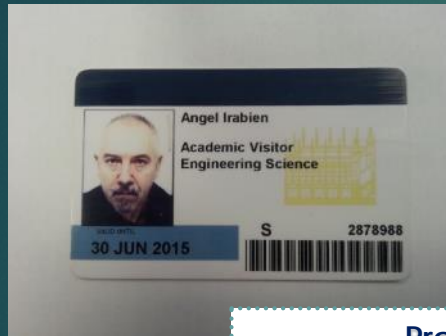


Jenifer Gómez
Chemical and Biological Department
University of Buffalo
Buffalo, USA



Sara Domínguez
Department of Biomedical, Chemical and
Environmental Engineering (DBCEE)
University of Cincinnati.
Ohio, USA

Research mobility of the faculty.



Prof. Ángel Irabien
Academic Visitor
Department of Engineering Science
University of Oxford
Oxford, United Kingdom



Dr. Antonio Domínguez
Imperial College
London, United Kingdom



Incoming students at University of Cantabria

Predoctoral Research Stay



**Cristina Arely
de León Condes
National Autonomous
University of Mexico**

**CORNELL – CANTABRIA Undergraduate Chemical
Engineering Program**



**American students at the University of Cantabria
(Spain)**



**Spanish students at Cornell University
(USA)**

R&D: Awards

Dr. Jonathan Albo receives the Award 2014 to Distinguished PhD thesis in the file of Engineering.



Dr. Jonathan Albo is awarded with the Prize "Juan María Parés" of the Social Council of the University of Cantabria, for the best doctoral thesis

PhD. student Carolina Fernández receives the award to distinguished poster of the II Conference of Young scientists of Cantabria region



Dr. Ricardo Abejón has been proposed by the University of Cantabria for the 2015 Award of Disginquised Doctorate in the field of Engineering.

Prof. Ignacio Grossmann will receive the Honoris Causa
Doctorate of the University of Cantabria



The proposal was raised by the Department of Chemical and Biomolecular Engineering of the University of Cantabria, and was approved in June 4th by the Board of Government of the Higher Education Institution. The ceremony award will take place in January 27th, 2015.

Saint Joseph's Day, March 23th, 2015

After a conference on sailing by Jan Abascal, the different diplomas awarding those students who have obtained **the best marks after graduation** were given. In the chemical engineering area, Beatriz Gómez, Selene Cobo and Paula Ribao obtained the award from Chemical Engineering and Master studies, with the works "Caracterización de las propiedades de transporte de membranas biodegradables de poly-ε-caprolactona en Ingeniería Tisular", "Diseño y simulación de un proceso de secado de biomasa en una central termoeléctrica", and "Influencia de la radiación y la concentración de TiO₂" en la generación de radicales hidroxilo en un reactor fotocatalítico. Aplicación a la degradación de dodecibencensulfato (DBS)", respectively.



The AIChE students chapter of the University of Cantabria, handed over the **poster awards** to winners of the poster contest:

1st Prize: "Electrochemical conversion of CO₂ to useful chemicals: towards a more sustainable world", by Pérez, J., Ruiz, N.

2nd Prize: "Urban Wastewater treatment based on algae cultivations" by Baquero M.; Chen. Y.R.; San Miguel M.

3rd Prize: "Benzene; raw material highly versatile" by Castañeda, M.

Accesit: "Polystyrene lifecycle" by Castañeda, M.

R&D: Participation in national and international organisms

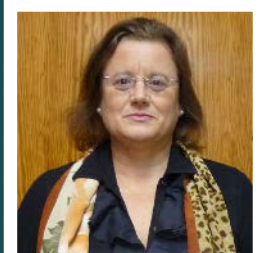


**President of the Section “Environmental Protection and Sustainability”
of the European Federation of Chemical Engineering (EFCE) 2011-2014**

**Secretary of the Assessment Committee “Engineering and Architecture” of
UNIBASQ**

**Member of the Evaluation Committee of Post-doctoral research grants of the
Irish Research Council for Science, Engineering and Technology.**

Member of the Scientific Board of JPI Water



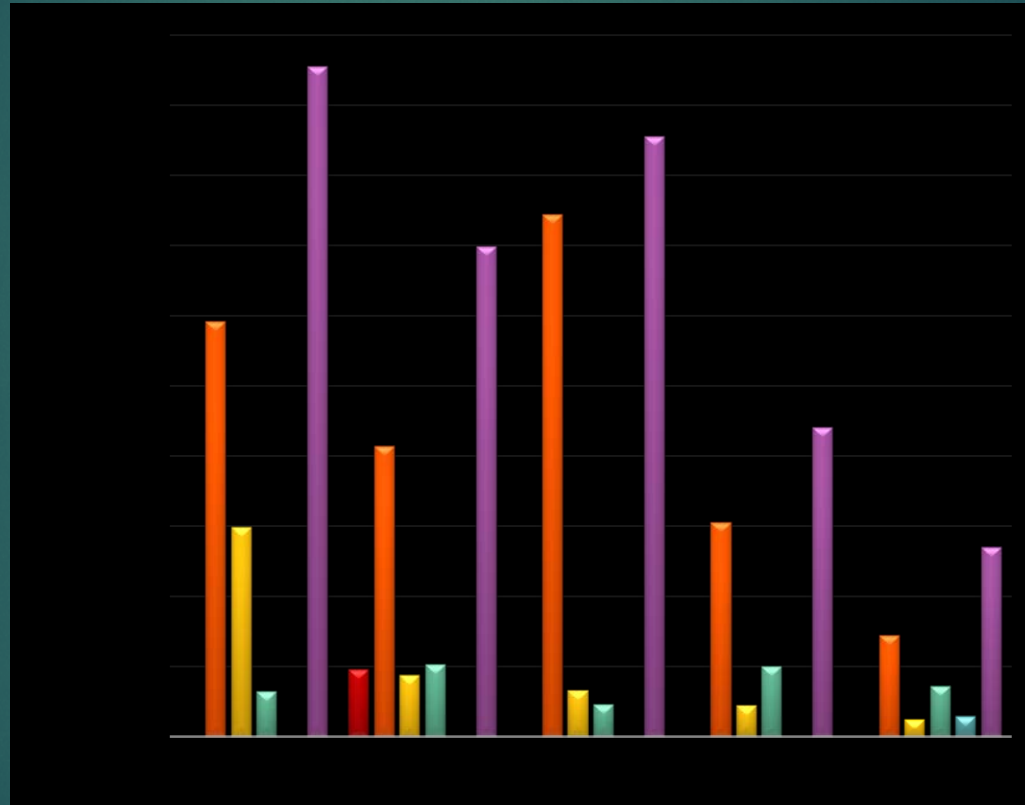
**Scientific Coordinator of Chemical Technology at the National
Assesment Agency (ANEP)**

**Scientific Assessor in Chemical and Environmental Technology R&D
programs of the Ministry of Economy and Competitiveness-Department
of Research Projects**



R&D: Projects

The research groups of SOSPROCAN team are active and competitive R&D groups. Below there is a summary of the projects income, and competitive grant programs funded by various agencies and private companies over the past five years.



■ EU ■ National ■ Regional ■ Private Companies ■ PAR ■ Total

R&D INCOME FROM 2008 TO 2012

R&D: Projects

Title: **Desarrollo e integración de procesos con membranas para la captura y valorización de dióxido de carbono (CTQ2013-48280-C3-1-R)**

Financial support: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD

Main Researcher: Prof. Ángel Irabien Gulías / Aurora Garea

Dates: 01/01/2014 – 31/12/2016

Title: **Estudio de la Estabilización de Cenizas Volantes de Incineración Mediante Carbonatación.**

Financial support: SADER S.A.

Main Researcher: : Prof. Ángel Irabien Gulías

Dates: 03/2015 – 12/2015

Title: **Sostenibilidad de la producción de Cantabria**

Financial support: Universidad de Cantabria

Main Researcher: : Prof. Ángel Irabien Gulías

Dates: 10/01/2012 – 09/01/2016

Title: **Ensayos Sosprocan: Ensayos e informes de caracterización de muestras sólidas y líquidas mediante ensayos físico-químicos**

Participant entities: Universidad de Cantabria, Convenio FLTQ

Main Researcher: Prof. Ángel Irabien Gulías

Dates: 02/2008 –

Title: **Valorización química sostenible de dióxido de carbono (CTQ2014-55716-REDT)**

Financial support: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD

Main Researcher: Prof. Ángel Irabien Gulías

Dates: 01/01/2014 – 31/12/2016

R&D: Projects

Title: **Participación como experto en certificación de proyectos de I+D+i**

Financial support: DNVGL Business Assurance España S.L.

Main Researcher: : Prof. Inmaculada Ortiz Uribe

Dates: 15/06/2015 – 25/03/2018

Title: **Nitralim**

Financial support: ABENGOA RESEARCH S.L.

Main Researcher: Prof. Inmaculada Ortiz Uribe

Dates: 16/03/2015 – 31/12/2015

Title: : **Diseño y caracterización de Nano-materiales magnéticos como agentes de separación**

Financial support: Ayudas para la Incentivación de Proyectos de I+D, SODERCAN – Universidad de Cantabria

Main Researcher: Prof. Inmaculada Ortiz Uribe

Dates: 01/06/2015 – 31/05/2016

Title: **Nitralim**

Financial support: ABENGOA RESEARCH S.L.

Main Researcher: Prof. Inmaculada Ortiz Uribe

Dates: 16/03/2015 – 31/12/2015

Title: **Evaluación de Proyectos**

Financial support: EQA CERTIFICADOS I+D+I, S.L.U.

Main Researcher: Prof. Inmaculada Ortiz Uribe

Dates: 27/07/2014 – 31/12/2017

R&D: Projects

Title: Nuevos procesos de separación con control cinético basados en la utilización de materiales funcionalizados (cofinanciado con fondos FEDER) CTQ2012-31639.

Financial support: Ministerio de Economía y Competitividad

Main Researcher: Prof. Inmaculada Ortiz Uribe

Dates: 01/01/2013 – 31/12/2015

Title: Reparación y mantenimiento de equipos

Main researcher: Prof. Inmaculada Ortiz Uribe

Title: Promoción de la investigación

Main Researcher: Prof. Inmaculada Ortiz Uribe

Title: Líneas de investigación del grupo procesos avanzados de separación

Financial support: UNIVERSIDAD DE CANTABRIA

Main Researcher: Prof. Inmaculada Ortiz Uribe

Dates: 27/07/2012 – 26/07/2016

Title: Desarrollo de tecnologías innovadoras para el tratamiento de contaminantes perfluorados en aguas (CTM2013-44081-R)

Financial support: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD

Main researcher: Prof. Ana María Urtiaga Mendía and Dr. Daniel Gorri

Date: 01/01/2014 – 31/12/2016

R&D: Projects

Title: Nuevos nanomateriales funcionalizados basados en grafeno como soportes para la regeneración de tejido nervioso

Financial support: Convocatoria Cantabria Explora del Parlamento de Cantabria / Universidad de Cantabria

Main researcher: Prof. Ana María Urtiaga Mendía

Date: 2014-2016

Title: Investigación en tecnología avanzadas para el tratamiento de contaminantes emergentes en aguas

Financial support: UNIVERSIDAD DE CANTABRIA

Main Researcher: Prof. Ana María Urtiaga Mendía

Dates: 17/03/2014 – 16/03/2015

Title: Proyecto para el Desarrollo de Doctorado Industrial "Desarrollo y caracterización de filmes multicapa extruídos en base polimérica aplicado al entrecruzamiento mediante radiación ionizante"

Financial support: Universidad de Cantabria - Parlamento de Cantabria

Main researcher: Prof. Ana María Urtiaga Mendía

Date: 2015 - 2018

Title: Cromatógrafo de gases (GC) con detector de captura de electrones (ECD) y espectrómetro de masas (MS)

Financial support: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD

Main researcher: Prof. Ana María Urtiaga Mendía

Date: 01/01/2010 – 31/12/2015

Title: Investigación en tecnologías avanzadas para el tratamiento de contaminantes emergentes en aguas. VP14

Financial support: Universidad de Cantabria

Main researcher: Prof. Ana María Urtiaga Mendía

Date: 17/03/2014 – 16/03/2015

R&D: Projects

Title: **Recuperación de ácidos de decapado agotados enriquecidos en Zinc – 2ª Parte**

Financial support: LUNAGUA S.L.

Main researcher: Prof. Ana María Urtiaga Mendía

Date: 2014 - 2015

Title: **Cromatógrafo de gases (GC) con detector de captura de electrones (ECD) y espectrómetro de masas (MS)**

Financial support: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD

Main researcher: Prof. Ana María Urtiaga Mendía

Date: 01/01/2010 – 31/12/2015

Title: **Líneas de investigación del grupo tecnologías ambientales y bioprocesos**

Financial support: UNIVERSIDAD DE CANTABRIA

Main researcher: Prof. Ana María Urtiaga Mendía

Date: 08/09/2014 – 07/09/2016

Title: **Valorización sostenible de concentrados de procesos de desalación**

Financial support: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD - SECRETARIA DE ESTADO DE INVESTIGACION, DESARROLLO E INNOVACION

Main researcher: Raquel Ibáñez Mendizábal

Date: 14/10/2013 – 13/10/2016

Title: **Estrategias de valorización de salmueras, CTM2014-57833-R**

Financial support: MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

Main researcher: Dr. Raquel Ibáñez Mendizábal

Date: 2015-2017

R&D - Projects

Title: **Identificación y cuantificación de las variables responsables de la potencial formación de PCDD/Fs en procesos de oxidación avanzada. CTM201-58029-R**

Financial support: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD

Main researcher: Dr. María Fresnedo San Román San Emeterio

Date: 2015-2017

Title: **Study of separation of the NH₃ and HCl contained in the respective aqueous solution at different concentrations by membrane technologies**

Financial support: SOLVAY QUÍMICA S.L.

Main researcher: Dr. E. Daniel Gorri Cirella

Date: 01/05/2015 – 31/07/2016

Title: **Mejoras en el tratamiento de lixiviados de vertedero mediante tecnologías de oxidación avanzada CTM2012-33917**

Financial support: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD

Main researcher: Dr. María José Rivero Martínez

Date: 01/01/2013 – 31/12/2015

Title: **Manganeso en aire urbano: niveles de concentración y depósito, caracterización físico-química y modelización mediante modelos de dispersión (CTM2013-43904-R)**

Financial support: Ministerio de Economía y Competitividad

Main Researcher: Ignacio Fernández Olmo

Dates: 01/01/2014 – 31/12/2016

Title: **Gestión sostenible de la anchoa del cantábrico: estrategias locales para un desarrollo global (CTM2013-43539-R)**

Financial support: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD

Main Researcher: Rubén Aldaco García

Dates: 01/01/2014 – 31/12/2016

R&D - Projects

Title: Desarrollo y aplicación de herramientas para la gestión ambiental de procesos y productos bajo una perspectiva de ciclo de vida

Financial support: UNIVERSIDAD DE CANTABRIA

Main Researcher: Rubén Aldaco García

Dates: 24/11/2014 – 23/11/2016

Title: Estudio de alternativas de mejora en el diseño de quemadores para encimeras de gas

Financial support: BSH ELECTRODOMESTICOS ESPAÑA, S.A.

Main Researcher: Eugenio Bringas Elizalde

Dates: 24/11/2014 – 23/11/2015

Title: Production of electricity from fossil fuels with virtually zero air pollution

Financial support: ELIOT S. GERBER

Main Researcher: Clara Casado Coterillo

Dates: 12/02/2014 – 11/05/2015

Title: Nuevas membranas selectivas para la separación de CO₂ (CTQ2012-31229)

Financial support: MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

Main Researcher: Dr. Clara Casado Coterillo

Dates: 01/01/2013 – 31/12/2016

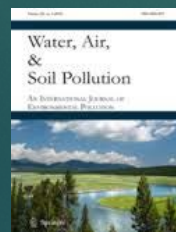
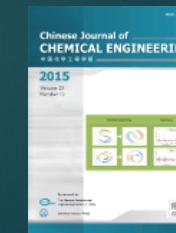
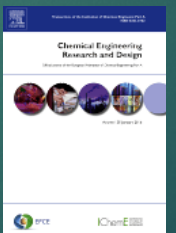
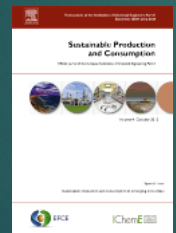
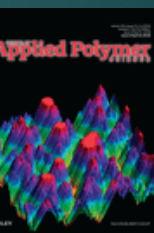
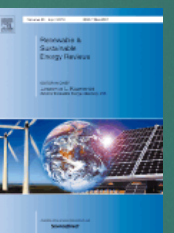
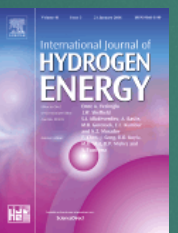
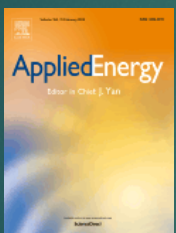
Title: Extraction and Purification of Lignin by Means of Supported Ionic Liquid Membranes (CTQ2014-56820-JIN) Financial support: MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

Main Researcher: Ricardo Abejón Elías

Dates: 10/2015 – 09/2018

R&D: Publications

The results of our research activity are **published in international journals** after their peer review evaluation by specialized referees who support the quality of our research.



R&D: Publications

Abejón-Elías, A., Garea-Vázquez, A., Irabien, A. Arsenic removal from drinking water by reverse osmosis: minimization of costs and energy consumption. *Separation and Purification Technology* 144, 46-53, 2015.

Abejón-Elías, R., Garea Vázquez, A., Irabien, A. Multiobjective Optimization Applied to the Integration of Polyamide and Cellulose Acetate Reverse Osmosis Membranes in Hybrid Cascades for Ultrapurification of Wet Chemical. *Industrial and Engineering Chemistry Research* 54(3), 1006-1014, 2015.

Abejón Elías, R., Abejón Elías, A., Biasi, P., Gemo, N., Garea Vazquez, A., Salmi, T., Irabien Gulias, A. Hydrogen peroxide obtained via direct synthesis as alternative raw material for ultrapurification process to produce electronic grade chemical. *Journal of Chemical Technology & Biotechnology*, DOI: 10.1002/jctb.4699, 2015.

Abejón Elías, R., Garea-Vázque, A., Irabien, A., Organic solvent recovery and reuse in pharmaceutical. *Chemical Engineering Transactions* 43, 1057-1062, 2015.

Albo Sanchez, J., Sáez, A., Solla-Gullón, J, Montiel, V., Irabien Gulias, A. Production of methanol from CO₂ electroreduction at Cu₂O and Cu₂O/ZnO-based electrodes in aqueous solution. *Applied Catalysis B: Environmental* 176, 709-717, 2015.

Albo Sanchez, J., Alvarez Guerra, M., Castaño, P., Irabien, A. Towards the electrochemical conversion of carbon dioxide into methanol. *Green Chemistry* 17(4) 2304-2324, 2015.

Álvarez-Guerra, E., Irabien, A. Ionic liquid-based three phase partitioning (ILTPP) systems for whey protein recovery: ionic liquid selection. *Journal of Chemical Technology and Biotechnology* 90 (5), 939-946 , 2015.

Álvarez-Guerra, E., Irabien, A. Optimization of ionic liquid recycling in Ionic Liquid-based Three Phase Partitioning processes. *Computer-Aided Chemical Engineering Biotechnology* 37, 1475-1480.

Álvarez-Guerra, E., Irabien, A. Separation of Proteins by Ionic Liquid-based Three-Phase Partioning. *Ionic Liquids in Separation Technology* (ISBN:978-0-444-63257-9), 207-234, Elsevier 2015.

Alvarez-Guerra, M., Albo Sanchez, J., Alvarez-Guerra, E., Irabien Gulias, A. Ionic liquids in the electrochemical valorisation of CO₂. *Energy & Environmental Science* 8, 2574-2599, 2015.

R&D: Publications

Bringas, E., Saiz, J., Ortiz, I. Removal of As(V) from groundwater using functionalized magnetic adsorbent materials: Effects of competing ions. *Separation and Purification Technology* 156, 699-707, 2015.

Carrillo-Abad, J., García-Gabladón, M., Ortiz-Gándara, I., Bringas, E., Urtiaga, A.M., Ortiz, I., Pérez-Herranz, V. Selective recovery of zinc from spent pickling baths by the combination of membrane-based solvent extraction and electrowinning technologies. *Separation and Purification Technology* 151, 232-242, 2015.

Del Castillo, A., Álvarez-Guerra, M., Solla-Gullón, J., Sáez, M., Montiel, V., Irabien, A. Electrocatalytic reduction of CO₂ to formate using particulate Sn electrodes: Effect of metal loading and particle size. *Applied Energy* 157, 165-173, 2015.

Díaz, M., Ortiz, I., Isik, M., Mecerreyes, D., Ortiz, I. Highly conductive electrolytes based on poly([HSO₃-BVI_m][TfO])/[HSO₃-BVI_m][TfO] mixtures for fuel cell applications. *International Journal of Hydrogen Energy* 40, 11294-11302, 2015.

Dominguez, S., Ribao, P., Rivero, M.J., Ortiz, I. Influence of radiation and TiO₂ concentration on the hydroxyl radicals generation in a photocatalytic LED reactor. Application to dodecylbenzenesulfonate degradation. *Applied Catalysis B: Environmental* 178, 165-169, 2015.

Fernández-Barquín, A., Casado-Coterillo, C., Palomina, M., Valencia, S., Irabien, A. LTA/poly(1-trimethylsilyl-1-propyne) mixed-matrix membranes for high-temperature CO₂/N₂ separation. *Chemical Engineering & Technology* 38(4), 658-666

Fernández-Castro, P., Vallejo, M., San Roman, M.F. Ortiz, I. Insight on the fundamentals of advanced oxidation processes. Role and review of the determination methods of reactive oxygen species. *Journal of Chemical Technology and Biotechnology*. 90, 796-820, 2015.

Fernandez-Gonzalez, C., Dominguez-Ramos, A., Ibañez, R., Irabien, A. Sustainability assessment of electrodialysis powered by photovoltaic solar energy for freshwater production. *Renewable and Sustainable Energy Reviews* 47, 604-615, 2015.

Fernandez-Gonzalez, C., Zhang B., Dominguez-Ramos, A., Ibañez, R., Irabien, A., Chen, Y. Enhancing commercial anion exchange membrane using functionalized iron oxide nanoparticles. *Journal of Membrane Science*, envasubmitted. January 2016.

R&D: Publications

Fernández-Olmo, I., Puente, M., Irabien, A. A comparative study between the fluxes of trace elements in bulk atmospheric deposition at industrial, urban, traffic, and rural sites. *Environmental Science and Pollution Research* 22(17) 13427-41, 2015.

García-Cruz, L., Casado-Coterillo, C., Iniesta, J., Montiel, V., Irabien, A. Preparation and characterization of novel chitosan-based mixed matrix membranes resistant in alkaline media. *Journal of Applied Polymer Science* 132(29), 42240 (1-10), 2015.

García-Cruz, L., Casado-Coterillo, C., Iniesta, J., Montiel, V., Irabien, A. Chitosan:poly (vinyl) alcohol composite alkaline membrane incorporating organic ionomers and layered silicate materials into a PEM electrochemical reactor. *Journal of Membrane Science* 498, 395-407, 2016.

García-Herrero, I., Alvarez-Guerra, M., Irabien, A. Electrosynthesis of dimethyl carbonate from methanol and CO₂ using potassium methoxide and the ionic liquid [bmim][Br] in a filter-press cell: a study of the influence of cell configuration. *Journal of Chemical Technology and Biotechnology* 91(2), 507-513, 2016.

García-Herrero, I., Alvarez-Guerra, M., Irabien, A. CO₂ electro-valorization to dimethyl carbonate from methanol using potassium methoxide and the ionic liquid [bmim][Br] in a filter-press electrochemical cell. *Journal of Chemical Technology & Biotechnology* 90(8), 1433-1438, 2015.

Irabien, A., Margallo, M., Aldaco, R., Barceló, A., Diban, N., Ortiz, I. Life cycle assessment of technologies for partial dealcoholisation of wines. *Sustainability Production and Consumption* 2, 29-39 , 2015.

Jadhav, S.V., Bringas, E., Yadav, G.D., Rathod, V.K., Ortiz, I., Marathe, K.V. Arsenic and fluoride contaminated groundwaters: A review of current technologies for contaminants removal. *Journal of Environmental Management* 162, 306-325, 2015.

Laso, J., García, V., Bringas, E., Urtiaga, A., Ortiz, I. Selective recovery of zinc over iron from spent pickling wastes by different membrane based solvent extraction configurations. *Industrial & Engineering Chemistry Research*, 54, 3218-3224, 2015.

R&D: Publications

López-Guerrero, M., Casado-Coterillo, C., Irabien, A. Synergistic effect of combining Titanosilicate and 1-ethyl-3-methylimidazolium acetate in mixed matrix membranes for efficient CO₂ separation. *European Journal of Sustainable Development* 4(4), 103-115, 2015.

Margallo, M., Taddeo, M.B., Hernández-Pellón, A.M., Aldaco, R., Irabien, A. Environmental sustainability assessment of the management of municipal solid waste incineration residues: A review of the current situation. *Clean Technologies and Environmental Policy* 17, 1333-1353, 2015.

Pérez-González, A., Ibáñez, R., Gómez, P., Urtiaga, A.M., Ortiz, I., Irabien, J.A. Recovery of desalination brines resources. Separation of divalent ions as a pretreatment step. *Desalination and Water Treatment*, 56, 3617-3625, 2015.

Pérez-González, A., Ibáñez, R., Gómez, P., Urtiaga, A.M., Ortiz, I., Irabien, J.A. Polyvalent and Monovalent anions in desalination brines. *Journal of Membrane Science*, 473, 16-27, 2015.

Pinedo, J., García-Prieto, C.V., D'Alessandro, A.A., Ibáñez, R., Tonelli, S., Díaz, M.S., Irabien, A. Microalgae biorefinery alternatives and hazard evaluation. *Chemical Engineering Research and Design*, doi:10.1016/j.cherd.2015.10.039 , 2015.

Santos, E., Fernández-Olmo, I., Irabien, A. Estimation of PM₁₀-Bound As, Cd, Ni and Pb Levels by Means of Statistical Modelling: PLSR and ANN Approaches. *Water, Air & Soil Pollution* 226(8), 1-14, 2015.

Santos, E., Rodríguez-Fernández, E., Casado-Coterillo, E., Irabien, A. Hybrid ionic liquid-chitosan membranes for CO₂ separation: Mechanical and thermal behavior. *International Journal of Chemical Reactor Engineering*, 1-6, 2015.

Schaefer, C.E., Andaya, C., Urtiaga, A., McKenzie, E.R., Higgins, C.P. Electrochemical treatment of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) in groundwater impacted by aqueous film forming foams (AFFFs). *Journal of Hazardous Materials* 295,170-175, 2015.

Schaefer, C., Andaya, C., Urtiaga, A. Assessment of Disinfection and By-Product Formation during Electrochemical Treatment of Surface Water using a Ti/IrO₂ Anode. *Chemical Engineering Journal*, 264, 411-416, 2015.

R&D: Publications

Urtiaga, A., Fernandez, C., Gomez-Lavin, S., Ortiz, I. Kinetics of the electrochemical mineralization of perfluorooctanoic acid on ultrananocrystalline boron doped conductive diamond electrodes. *Chemosphere*, 129, 20-26, 2015.

Vallejo, M., San Román, M.F., Ortiz, I., Irabien, A. Overview of the PCDD/Fs degradation potential and formation risk in the application of advanced oxidation processes (AOPs) to wastewater treatment. *Chemosphere* 118, 44-56, 2015.

Vallejo, M., Fernández, P., San Román, M.F., Ortiz, I. Assessment of PCDD/Fs formation in the Fenton oxidation of 2-chlorophenol: influence of the iron dose applied. *Chemosphere* 137, 135-141, 2015.

Zarca, G., Ortiz, I., Urtiaga, A. Recovery of carbon monoxide from flue gases by reactive absorption in ionic liquid imidazolium chlorocuprate(I): Mass transfer coefficients. *Chinese Journal of Chemical Engineering*, 23, 769-774, 2015.

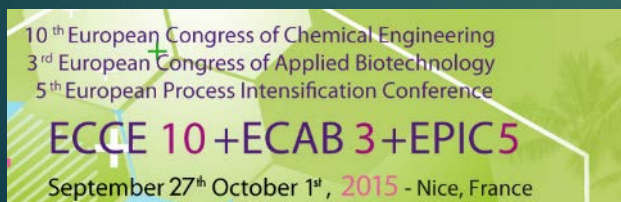
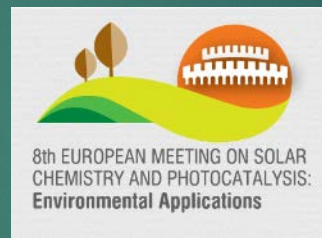
Zarca, G., Ortiz, I., Urtiaga, A.M. Behaviour of 1-hexyl-3-methylimidazolium chloride supported ionic liquid membranes in the permeation of CO₂, H₂, CO and N₂ single and mixed gases. *Desalination and Water Treatment*, 56, 3640-3646, 2015.

Zarca, G., Fernández, M., Santamaría, A., Urtiaga, A., Ortiz, I. Non-Newtonian ionic liquids in gas absorption: shear thinning viscosity of 1-hexyl-3-methylimidazolium chloride and effect of CuCl addition. *Separation and Purification Technology*, 155, 96-100, 2015.

Zarca, G., Urtiaga, A., Ortiz, I., Cañizares, P., Rodrigo, M. Electrochemical determination of copper mass transport properties in basic 1-hexyl-3-methylimidazolium chlorocuprate(I) ionic liquid. *Separation and Purification Technology* 141, 31-37, 2015.

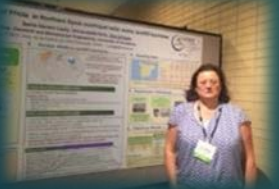
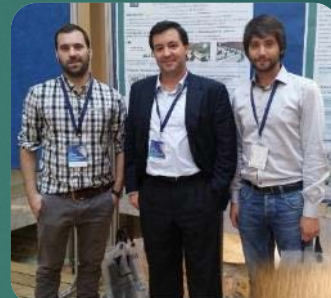
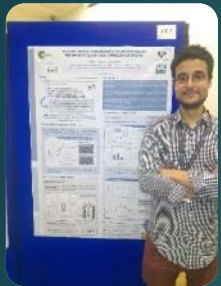
R&D: Congress and Conference Contributions

The main progress achieved during our research activity is internationally disseminated through scientific congresses.



R&D: Congress and Conference Contributions

Some pictures during the celebration of the congresses and conferences



R&D: Congress and Conference Contributions

Albo, J., Castaño, P., Irabien, A. Conversión electroquímica de dióxido de carbono a metanol en continuo sobre mezclas de $\text{Cu}_2\text{O}/\text{ZnO}$ depositadas en soportes de carbono, presented at **Jornadas sobre Usos y Conversión de CO_2 : retos y oportunidades” de la Plataforma Tecnológica Española del CO_2 y SUSCHEM**. February 17-18, 2015. Madrid, Spain.

Álvarez-Guerra, M., Irabien, A. Vías de valorización electroquímica de CO_2 , presented at **Jornadas sobre Usos y Conversión de CO_2 : retos y oportunidades” de la Plataforma Tecnológica Española del CO_2 y SUSCHEM**. February 17-18, 2015. Madrid, Spain.

Del Castillo, A., Álvarez-Guerra, M., Irabien, A. Valorización de CO_2 por vía electroquímica utilizando electrodos de Sn para la obtención de formiato, presented at **Jornadas sobre Usos y Conversión de CO_2 : retos y oportunidades” de la Plataforma Tecnológica Española del CO_2 y SUSCHEM**. February 17-18, 2015. Madrid, Spain.

Ribao, P., Rivero, M.J., Ortiz, I. Synthesis of GO/TiO_2 composite through hydrothermal method for photocatalytic application, presented at **Imaginenano 2015 (Graphene 2015)**. March 10-13, 2015. Bilbao, Spain.

Ortiz, A., Díaz, M., Ortiz, I. Highly proton conductive membranes based on polymerized ionic liquids for non-humidified fuel cell application, presented at **Europolymer Conference 2015 (EUPOC2015)**. May 24-28, 2015. Gargnano, Italy.

García-Herrero, I., Cuellar, R., Enríquez-Gutiérrez, V.M., Álvarez-Guerra, M., Irabien, A. Life cycle assessment of dimethyl carbonate production processes: oxidative carbonylation vs. direct synthesis from CO_2 , presented at **4th International Congress on Sustainability Science & Engineering**. May 26-29, 2015 Balatonfüred, Hungary.

Margallo, M., Aldaco, R., Irabien, A. Environmental sustainability assessment of a multifunctional process: municipal solid waste incineration in the Iberian Peninsula, presented at **4th International Congress on Sustainability Science & Engineering**. May 26-29, 2015 Balatonfüred, Hungary.

Pinedo, J., García-Prieto, C.V., D'alejandro, A.A., Díaz, M.S., Tonelli, S., Ibáñez, R., Irabien, A., Ortiz, I. Biorefinery process optimization and risk estimation at industrial level, presented at **PSE2015/ESCAPE25**. May 31 – June 4, 2015. Copenhagen, Denmark.

R&D: Congress and Conference Contributions

Álvarez-Guerra, M., Albo, J., Irabien, A. Electrochemical valorisation of CO₂: innovative processes for obtaining formate, methanol and DMC, presented at **7th European Meeting on Chemical Industry and Environment**. June 10-12, 2015. Tarragona, Spain.

González-Fernández, C., Domínguez-Ramos, A., Ibáñez, R., Irabien, A. The state-of-the-art of the electrodialysis for the treatment and valorization of desalination brines, presented at **7th European Meeting on Chemical Industry and Environment**. June 10-12, 2015. Tarragona, Spain.

Pinedo, J., D'Alessandro, A.A., García-Prieto, C.V., Díaz, M.S., Tonelli, S., Ibáñez, R., Irabien, A. Industrial risk estimation as a decision tool in an integrated microalgae biorefinery process, presented at **7th European Meeting on Chemical Industry and Environment**. June 10-12, 2015. Tarragona, Spain.

Zarca, G., Ortiz, I., Urtiaga, A. Ionic liquid-based technologies for CO and H₂ recovery from tail-gas of carbon black manufacturing, presented at **7th European Meeting on Chemical Industry and Environment**. June 10-12, 2015. Tarragona, Spain.

Rivero, M.J., Gómez, P., Domínguez, S., Ibáñez, R., Urtiaga, A.M., Ortiz, I. New LEDs reactor designs for photocatalysis applied to water treatment, **7th European Meeting on Chemical Industry and Environment**. June 10-12, 2015. Tarragona, Spain.

Pinedo, J., D'Alessandro, A.A., García-Prieto, C.V., Díaz, M.S., Tonelli, S., Ibáñez, R., Irabien, A. Industrial risk estimation as a decision tool in an integrated microalgae biorefinery process., **7th European Meeting on Chemical Industry and Environment**. June 10-12, 2015. Tarragona, Spain.

Fernández-González, C., Domínguez-Ramos, A., Ibáñez, R., Irabien, A. The state-of-the-art of the electrodialysis for the treatment and valorization of desalination brines, **7th European Meeting on Chemical Industry and Environment**. June 10-12, 2015. Tarragona, Spain.

Zarca, R., Ortiz, A., Gorri, D., Ortiz, I. POLYMER-IONIC LIQUIDS-AG+ COMPOSITE MEMBRANES FOR PROPANE/PROPYLENE SEPARATION, presented at **European Membrane Society Summer School 2015**. June 21-26, 2015, Stráž pod Ralskem, Czech Republic.

R&D: Congress and Conference Contributions

Rivero, M.J., Domínguez, S., Ribao, P., Ortiz, I. Influence of radiation on the •OH generation in a photocatalytic led reactor. application to removal of dodecylbenzenesulfonate, presented at **8th European Meeting on Solar Chemistry and Photocatalysis: Environmental Applications - SPEA8**. June 25-28, 2015. Thessaloniki, Greece.

Álvarez-Guerra, E., Ventura, S., Álvarez-Guerra, M., Coutinho, J., Irabien, J. Modeling of the binodal curve of ionic liquid/salt systems, presented at **X Iberoamerican Conference on Phase Equilibria and Fluid Properties-EQUIFASE 2015**. June 28 – July 1, 2015, Alicante, Spain.

Álvarez-Guerra, E., Ventura, S., Álvarez-Guerra, M., Coutinho, J., Irabien, A. Assessment of the equilibrium in ionic liquid/salt aqueous biphasic systems: modeling of the binodal curve, presented at **Iberoamerican Meeting on Ionic Liquids – IMIL 2015**. July 2-3, 2015. Madrid, Spain.

Zarca, G., Horne, W.J., Bara, J., Ortiz, I., Urriaga, A. Synthesis and gas separation performance of copper(I)-containing poly(rtil)-rtil composite membranes, presented at **Iberoamerican Meeting on Ionic Liquids – IMIL 2015**. July 2-3, 2015. Madrid, Spain.

Zarca, R., Ortiz, A., Gorri, D., Ortiz, I. Facilitated transport composite membranes based on polymer-ionic liquids-Ag⁺ for propane/propylene separation, presented at **Iberoamerican Meeting on Ionic Liquids – IMIL 2015**. July 2-3, 2015. Madrid, Spain.

Gorri, D., Norkobilov, A., Ortiz, A., Ortiz, I. Propylene purification in a hybrid system using polymer-ionic liquid composite membranes, presented at **Iberoamerican Meeting on Ionic Liquids – IMIL 2015**. July 2-3, 2015. Madrid, Spain.

Gómez-Lavín, S., Ortiz, I., Urriaga, A. Occurrence of perfluorinated compounds (pfas) in northern Spain municipal solid waste landfill leachates, presented at **FLUOROS2015, an International Symposium on Fluorinated Chemicals in the Environment**. July 12-14, 2015. Colorado, USA.

Schaefer, C.E., Higgins, C., McKenzie, E., Andaya, C., Urriaga, A. Electrochemical treatment of perfluorooctanoic acid (pfoa) and perfluorooctane sulfonic acid (PFOS) in groundwater, presented at **FLUOROS2015, an International Symposium on Fluorinated Chemicals in the Environment**. July 12-14, 2015. Colorado, USA.

R&D: Congress and Conference Contributions

Del Castillo, A., Álvarez-Guerra, M., Solla, J., Sáez, A., Montiel, V., Irabien, A. Síntesis de nanopartículas de Sn para la valorización electroquímica de CO₂ hacia formiato, presented at **XXXVI Reunión del grupo de electroquímica de la Real Sociedad Española de Química. XVII Encontro Ibérico de Electroquímica**. July 13-15, 2015. Vigo, Spain.

García-Cruz, L., Casado-Coterillo, C., Iniesta, J., Montiel, V., Irabien, A. Modificación de la membrana basada en quitosano/poli vinil alcohol con aditivos para la oxidación de alcoholes en medio alcalino, presented at **XXXVI Reunión del grupo de electroquímica de la Real Sociedad Española de Química. XVII Encontro Ibérico de Electroquímica**. July 13-15, 2015. Vigo, Spain.

Merino, I., Álvarez-Guerra, E., Irabien, A. Reducción electroquímica de CO₂ hacia hidrocarburos, presented at **XXXVI Reunión del grupo de electroquímica de la Real Sociedad Española de Química. XVII Encontro Ibérico de Electroquímica**. July 13-15, 2015. Vigo, Spain.

Aldaco, R., Margallo, M., Gazulla, C., Fullana, P., Irabien, A. Life cycle inventory analysis of Cantabrian anchovy production from cradle to gate, presented at **CILCA 2015**. July 13-16, 2015. Lima, Peru.

Del Castillo, A., Álvarez-Guerra, M., Solla, J., Sáez, A., Montiel, V., Irabien, A. Valorización de CO₂: Electroreducción hacia formiato con electrodos nanoparticulados de Sn, presented at **XXXV Reunión Bienal de la Real Sociedad Española de Química**. July 19-23, 2015. La Coruña, Spain.

Fernández-Barquín, A., Casado-Coterillo, C., Palomino, V., Valencia, S., Irabien, A. Estudio de la separación CO₂/N₂ mediante membranas de matriz mixta permselectivas, presented at **XXXV Reunión Bienal de la Real Sociedad Española de Química**. July 19-23, 2015. La Coruña, Spain.

García-Herrero, I., Cuéllar, R., Enríquez-Gutierrez, V.N., Álvarez-Guerra, M., Azapagic, A., Irabien, A. : Evaluación de Sostenibilidad Ambiental de un proceso innovador de electrosíntesis de dimetil carbonato a partir de CO₂, presented at **XXXV Reunión Bienal de la Real Sociedad Española de Química**. July 19-23, 2015. La Coruña, Spain.

Gómez-Coma, L., Garea, A., Irabien, A. Acoplamiento de la etapa de desorción a una planta de absorción no dispersiva, presented at **XXXV Reunión Bienal de la Real Sociedad Española de Química**. July 19-23, 2015. La Coruña, Spain.

R&D: Congress and Conference Contributions

Laso, J., Margallo, M., Aldaco, R., Irabien, A. Gesac-Conserva: Gestión sostenible de la anchoa del cantábrico: estrategias locales para un desarrollo local, presented at **XXXV Reunión Bienal de la Real Sociedad Española de Química**. July 19-23, 2015. La Coruña, Spain.

Margallo, M., Onandía, R., Aldaco, R., Irabien, A. Evaluación ambiental de la obtención de cloruro sódico en la industria cloro-álcali, presented at **XXXV Reunión Bienal de la Real Sociedad Española de Química**. July 19-23, 2015. La Coruña, Spain.

Merino, I., Álvarez-Guerra, E., Irabien, A. Carbon dioxide electrochemical reduction into hydrocarbons, presented at **XXXV Reunión Bienal de la Real Sociedad Española de Química**. July 19-23, 2015. La Coruña, Spain.

Zarca, G., Ortiz, I., Urriaga, A. Novel ionic liquid-based separation processes to recover carbon monoxide from nitrogen-rich streams, presented at **XXXV Reunión Bienal de la Real Sociedad Española de Química**. July 19-23, 2015. La Coruña, Spain.

Ribao, P., Rivero, M.J., Ortiz, I. Enhanced photocatalytic degradation of organic compounds using graphene oxide/titanium dioxide (Go/TiO₂) composites, presented at **XXXV Reunión Bienal de la Real Sociedad Española de Química**. July 19-23, 2015. La Coruña, Spain.

Gómez, B., Diban, N., Ortiz, I., Urriaga, A. Evaluation of transport properties of poly(ϵ -caprolactone) membranes in a bioreactor for tissue engineering, presented at **27th European Conference on Biomaterials ESB2015**. August 30 – September 3, 2015. Krakovia, Poland.

Aldaco, R., Laso, J., Margallo, M., Irabien, A. Environmental sustainability assessment to assist decision making process: the case study the fish canning industry, presented at **LCM 2015**. August 30 – September 2, 2015. Bordeaux, France.

Diban, N., Gómez, B., Lázaro-Diez, M., Ramos-Vivas, J., Ortiz, I., Urriaga, A. Comparison of poly(ϵ -caprolactone) and polyacrylonitrile membranes in bioreactors for neural tissue engineering, presented at **Euromembrane 2015**. September 6-10, 2015. Aachen, Germany.

R&D: Congress and Conference Contributions

Fernández-Barquín, A., Casado, C., Etxeberria-Benevides, M., Zuñiga, J., Irabien, A. Development of highly thermal and CO₂ selective membrane materials: Comparison of flat and hollow fibre geometry, presented at **Euromembrane 2015**. September 6-10, 2015. Aachen, Germany.

García-Cruz, L., Casado-Coterillo, C., Iniesta, J., Montiel, V., Irabien, A. New chitosan-polyvinyl alcohol composite membranes with organic and inorganic fillers for alkaline membrane in electrochemical reactor, presented at **Euromembrane 2015**. September 6-10, 2015. Aachen, Germany.

Gómez-Coma, L., Casado-Coterillo, C., Garea, A., Irabien, A. PVDF membrane contactors for CO₂ absorption, presented at **Euromembrane 2015**. September 6-10, 2015. Aachen, Germany.

Zarca, G., Ortiz, I., Urtiaga, A. Gas permeation properties of photopolymerized ionic liquid composite membranes containing a copper salt, presented at **Euromembrane 2015**. September 6-10, 2015. Aachen, Germany.

Zarca, R., Ortiz, A., Gorri, D., Ortiz, I. Mass transfer analysis in the facilitated transport of propylene through composite polymer-ionic liquid membranes, presented at **Euromembrane 2015**. September 6-10, 2015. Aachen, Germany.

Ortiz, A., Díaz, M., Ortiz, I. Ionic liquids membranes as highly proton conductive electrolytes for non-humidified fuel cell, presented at **Euromembrane 2015**. September 6-10, 2015. Aachen, Germany.

Ibáñez, R., Fernández-Olmo, I., Gorri, D., Urtiaga, A., Ortiz, I., Irabien, A. Impulso de los programas de Posgrado en el ámbito de la Ingeniería Química en la Universidad de Cantabria, presented at **XXXIII Jornadas de Ingeniería Química**. September 23-25, 2015. Málaga, Spain.

Zarca, G., Bringas, E., Álvarez-Guerra, E., Ortiz, A., Margallo, M., Casado-Coterillo, C., Ibáñez, R., Urtiaga, A., Ortiz, I. Programa de Intercambio en Ingeniería Química Universidad de Cantabria - CORNELL UNIVERSITY, presented at **XXXIII Jornadas de Ingeniería Química**. September 23-25, 2015. Málaga, Spain.

Gómez, B., Diban, N., Urtiaga, A., Ortiz, I. Evaluation of nutrient transport properties of poly(ϵ -caprolactone) membranes in a perfusion bioreactor for tissue engineering, presented at **10th European Congress of Chemical Engineering ECCE2015**. September 27 – October 1, 2015. Niza, France.

R&D: Congress and Conference Contributions

Zarca, G., Ortiz, I., Urtiaga, A. Mass transfer and reaction kinetics of carbon monoxide reactive absorption into ionic liquids, presented at **10th European Congress of Chemical Engineering ECCE2015**. September 27 – October 1, 2015. Niza, France.

Díaz, M., Ortiz, A., Ortiz, I. Polymerized ionic liquid for non-humidified proton exchange fuel cell applications, presented at **10th European Congress of Chemical Engineering ECCE2015**. September 27 – October 1, 2015. Niza, France.

Fernández-Barquín, A., Casado-Coterillo, C., Irabien, A. Separation of CO₂ and N₂ with two different membranes in series, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

Fernández-González, C., Mazón-Reigadas, A., Domínguez-Ramos, A., Ibáñez, R., Irabien, A. Electrodialysis with bipolar membranes powered by photovoltaic solar energy for the continuous production of acid and bases from desalination brines, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

Del Castillo, A., Álvarez-Guerra, M., Solla, J., Sáez, A., Montiel, V., Irabien, A. Electrochemical valorization of CO₂: GDEs based on Sn nanoparticles for a continuous process to obtain formate, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

García-Herrero, I., Cuéllar, R., Enríquez, V.M., Álvarez-Guerra, M., Irabien, A., Azapagic, A. Environmental sustainability assessment of an innovative dimethyl carbonate production process, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

Gómez, L., Garea, A., Rouch, J.C., Lahitte, J.F., Remigy, J.C., Irabien, A. CO₂ absorption using pvdf self-made membrane contactors and [emim][ac] ionic liquid, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

Gómez-Pastora, J., Xue, X., Bringas, E., Furlani, E.P., Ortiz, I. Novel adsorption processes incorporating magnetic nanoparticle recovery in continuous microfluidic systems, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

R&D: Congress and Conference Contributions

Irabien, A., Domínguez,-Ramos, A., Darton, R. From CO₂ to chemical products and fuels. A preliminary sustainability assessment, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

Saiz, J., Bringas, E., Ortiz, I. Design of functionalized magnetic nanoadsorbents for the removal of arsenic from polluted groundwater, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

Fernández-Castro, P., SanRoman, M.F., Ortiz, I. Assessment of PCDD/FS formation in the Fenton oxidation of 2-chlorophenol: role of the operating conditions, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

Ortiz-Gándara, I., San Román, M.F., Ortiz, I. Improved diffusive dialysis separation of HCl and Zn, presented at **10th European Congress on Chemical Engineering**. September 27 – October 1, 2015. Niza, France.

Laso, J., Margallo, M., Aldaco, R., Irabien, A. From the process to the product under a lifecycle approach: integrated prevention and pollution control in the fish canning industry, presented at **10th Conference on Sustainable Development of Energy, Water and Environment Systems, SDEWES 2015**. September 29 – October 2, 2015. Dubrovnik, Croatia.

Onandía, R., Aldaco, R., Margallo, M., Irabien, A. Energy, key factor on Chlor alkali Industry Sustainability and future, presented at **10th Conference on Sustainable Development of Energy, Water and Environment Systems, SDEWES 2015**. September 29 – October 2, 2015. Dubrovnik, Croatia.

Urtiaga, A., Gómez, B., Ortiz, I. Electrocatalytic and photoassisted degradation of perfluorooctanoic acid, presented at **4th European Conference on Environmental Applications of Advanced Oxidation Processes**. October 21-24, 2015. Athens, Greece.

Rivero, M.J., Escudero, C.J., Iglesias, O., Domínguez, S., Ortiz, I. New insights into the electro-oxidation of a model phenolic compound, p-cresol: effect of electrode material and electrolyte, presented at **4th European Conference on Environmental Applications of Advanced Oxidation Processes**. October 21-24, 2015. Athens, Greece.

R&D: Congress and Conference Contributions

Domínguez, S., Rivero, M.J., Ortiz, I. Photocatalytic removal of bisphenol a with a magnetically separable TiO₂ nanocomposite, presented at **4th European Conference on Environmental Applications of Advanced Oxidation Processes**. October 21-24, 2015. Athens, Greece.

Ribao, P., Rivero, M.J., Domínguez, S., Ortiz, I. Influence of the synthesis method on the photocatalytic activity of graphene oxide/titanium dioxide composites, presented at **4th European Conference on Environmental Applications of Advanced Oxidation Processes**. October 21-24, 2015. Athens, Greece.

Ortiz, A., Zarca, R., Gorri, D., Ortiz, I. Facilitated transport of propylene through composite polymer-ionic liquid membranes. mass transfer analysis, presented at **12th International Conference on Membrane Science and Technology**. November 1-3, 2015. Tehran, Iran.

Fernández-Castro, P., Vallejo, M., San Román, M.F., Ortiz, I. Assessment of PCDD/Fs formation in the advanced oxidation treatment of model solutions of 2-chlorophenol, presented at **13th HCH & Pesticides Forum 2015**. November 3-6, 2015. Zaragoza, Spain.

López-Guerrero, M.M., Casado-Coterillo, C., Irabien, A. Synergistic effect of combining Titanosilicate and 1-ethyl-3-methylimidazolium acetate in mixed matrix membranes for efficient CO₂ separation, presented at **3rd International Conference on Sustainable Development**. 2015. Rome, Italy.

Santos, E., Bilbao, J., Martín, N., Montiel, V., Rodríguez-Jiménez, J.J., Irabien, J., RED TEMÁTICA: Valorización Química Sostenible de Dióxido de Carbono, presented at **1^a JORNADA SOBRE USOS y CONVERSION DE CO₂: Retos y Oportunidades**. 2015. Madrid, Spain.

ANALYTICAL SERVICES



Analytical Services

Some of the **Analytical Services** provided by SOSPROCAN team are summarized next:

Metal content in solid and/or liquid samples

Determination by AA and optical ICP of mg/L metallic concentrations and ICP-MS for $\mu\text{g/L}$ concentrations.

Determination of Total Petroleum Hydrocarbons (TPHs) in soil

Determination by gas chromatography-FID

Analysis of organic priority pollutants and emerging pollutants

Determination of organic compounds by liquid and gas chromatography (micropollutants, PAHs, VOCs, ...)

Determination of environmental parameters

Determination of DOC, COD, BOD, Ecotoxicity, etc. in water.

Analysis of dissolved anions

Ion chromatography (F^- , Cl^- , NO_3^- ; SO_4^{2-} , Na^+ , Ca^{2+} ...)



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Goodbye Cornell Students

May 28th, 2015

The Department of Chemical and Biomolecular Engineering organizes a tour along Bércena Mayor as a farewell to the students of Chemical Engineering at Cornell University. It was a great experience, beginning of a long and fruitful period of exchanges.



Welcome Summer

July 30th, 2015

The Department of Chemical and Biomolecular Engineering organizes a trip to visit Cullavera Cavern, located in Ramales de la Victoria.

After the visit all the assistances had lunch in Ogarrio.



Christmas Party

22nd December 2015

Christmas Party of the Department of Chemical and Biomolecular Engineering with the assistance of more than 100 people that are part of the faculty, research, administration and services staff.

This year, a cocktail at the Santander's Casino was organized, where we had the opportunity of meeting with several friends of the department.



**Sustainable Production in Cantabria
Department of Chemical and Biomolecular Engineering**

**ETSIIyT, Universidad de Cantabria
Av. Los Castros s/n 39005 - Santander - Cantabria
Spain**

Tel.: +34 942 201585 / FAX: +34 942 201591





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<http://grupos.unican.es/depro/>



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