

CARENA

Newsletter – Issue 1 – November 2011

Editorial



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From the Coordinator ...

"Last week I had the opportunity to visit David Farrusseng at IRCELYON in Lyon and discuss the team's progress in the CARENA project. I was pleasantly surprised by the enthusiasm with which the team in Lyon is taking up the work. As part of the visit I was shown the extensive set of equipment IRCELYON has available for characterization of many different material aspects of catalyst and membranes.

Listening to David explain how unique experiments are being set up for the CARENA project, my thoughts went back to ICCMR9 in Lyon. After the conference, organized by IRCELYON, we had our first "official" meeting of the CARENA team. Many ideas, lots of ambitions and great intentions, but still far from a project which brings partners together with a common goal.

Two years later, we are an official consortium! Our logo, which proudly heads this first newsletter, contains a piece of a jigsaw puzzle to symbolize how we want to uncover the greater picture by bringing the pieces of the puzzle together. It was exciting to see the first pieces of the puzzle appear. Where and how will they fit? Following the intensive on-going discussion between partners cooperating on the different subjects I feel confident that already in the near future we will see parts of the greater CARENA picture emerge from these first pieces."

... and from the project manager, the same feeling expressed in the project's Current State (page2)

What is CARENA ?

The 1st of June 2011 marked the start of the **CARENA** project: **Catalytic Reactors based on New Materials for C1-C4 valorization**. It is an EU-funded collaborative project to create technologies enabling efficient conversion of light alkanes and CO₂ into higher value chemicals. To reduce the dependency of the European community on imported oil, the CARENA project will promote the implementation of catalytic membrane reactors in the European chemical industry.

**Collaborative Project: Large-scale integrating project
FP7-NMP-2010-LARGE-4**

48 months - Start day : 1st June 2011

www.carenafp7.eu

CARENA gathers 19 partners with high-level expertise in their fields all over Europe



CARENA in progress

1- Kick-off meeting 19-20 July 2011 The Netherlands

The KO meeting was kindly hosted by ECN and PDC on the 19-20th of July 2011 in The Netherlands.

The EC Scientific Officer Helge Wessel expressed that the EC will follow CARENA with great interest and wished all the participants success in the execution of the ambitious program.

The coordinator Arend de Groot introduced the project history and overall project plan using the analogue of a real expedition, jointly undertaken by the CARENA partners. Also, the objectives, the role of the team members, deliverables, dissemination activities and the timescales were reviewed. Each work package presented its work plan.

Break-out sessions were organized along the structure of the work packages 1, 2 and 3 with transversal participation from work packages 4, 5 and 6. This resulted in a better understanding of the interlinkage between the work packages and agreement on the first tasks.

An overview was given of the PhD students and post-doctoral researchers involved in CARENA.

In the last section the process for managing risks and issues was covered.



2 - Review of the Project's Current State

The enthusiasm of the partners and interactive atmosphere of the kick-off meeting was carried on in the work performed in the first half year of the project.

In phone conferences and meetings the work plans for the cross-disciplinary work packages were detailed and actions defined. Closely collaborating in the specific work packages the individual partners worked on their tasks covering a wide range of areas and activities. This not only includes technical work, such as development of membranes and catalysts, setup of experimental test facilities, laboratory (characterization) tests, development of process flowsheets, definition of modeling requirement for catalytic membrane reactors, but also various dissemination and management activities.

As the main platform for dissemination and internal information management, the CARENA website with secured intranet was established (carenafp7.eu). Several partners like Twente University and Leibniz University Hannover disseminated CARENA results in the form of papers or posters presentations. Harro Mengers of Twente University presented his work at the 13th Network Young Membranes, ICOM 2011, Amsterdam and the Netherlands Process Technology Symposium (NPS11).

In collaboration with ECN, Diamond (UK) studied structural changes of Pd- and Pd-alloyed membranes for hydrogen separation during operation with the objective to predict membrane lifetime and establish the operating window. First tests of samples with grazing incident X-ray diffraction (GI-XRD) and X-ray Adsorption Spectrometry (XAS) have revealed the suitability of both techniques for structural characterization of Pd and Pd-alloy membranes.

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3- Interview of CARENA's researchers : CNRS partner (France)



Dr. Anne JULBE : CNRS Head research scientist since 2004. In charge of the DM3 department on "Design of Membrane Materials and Multifunctional systems" at CNRS-IEM Montpellier, France.



Dr. David FARRUSSENG : Co-leader of the Engineering and Process Intensification group. at CNRS- IRCELYON. Lyon, France.

The CARENA project brings together Research labs, SMEs and industry. How do you view research-industry collaboration within the framework of the project?

AJ: I think it is vital for industry and academic groups to collaborate closely to find workable solutions. The project structure, with 3 work packages dedicated to applications and 3 transverse ones, will favor strong interactions and intensive collaboration between the partners. We've planned to meet regularly to discuss progress and how to solve the problems we are bound to have. Student exchanges with our industrial partners have also been planned: they will be central to defining specific industrial conditions of use that, of course, couldn't be included in the project description. Experiencing industrial scale is very important to improve lab work. Our PhD student will get to see what industrial constraints really are. Enormous quantities are involved: it is a different scale altogether!

DF: What we have with such a consortium is a real value chain... which is a real opportunity to accelerate the development of the discoveries made at lab scale.

What is the added-value of an EU project such as CARENA compared with other partnerships on the same topic you may be involved in?

AJ : One of the assets is that the project brings together experts from all the areas relevant to the multidisciplinary topic of the project. Multidisciplinary viewpoints should also bring about the possibility to test membrane reactions for uses we hadn't thought of in the first place. We'll also have the possibility to experiment both lab scale and bench scale. And we should also have opportunities to offer post-doc positions or jobs for the students involved in the project.

DF: The added-value of the project stands in the difference you have between the national and the international levels! Such a consortium which brings together world class experts in many different fields would not be possible to gather at a national level.

Read the full interview online...

*Thank you Anne and David, and all
the best for CARENA.*

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4- Overview : PhD and Post doc Students about their work subject : CNRS – Institut Européen des Membranes Montpellier (France) Claudia SALVADOR LEVEHANG (PhD student)



Claudia has just started her PhD within the framework of CARENA. She'll be working at IEM in Montpellier, France and her supervisor is Dr. Anne JULBE, who's in charge of the Institute's DM3 department on "Design of Membrane Materials and Multifunctional systems".

Welcome in the CARENA project Claudia. Where do you come from and what has your training been so far?

I come from Castellón de la Plana, a small town near Valencia, on the Mediterranean coast. There's sunshine almost all year round and the beach is part of our everyday life.

I studied Chemical Engineering at the University of Jaume I in Castellon, where I specialized in ceramic engineering. I spent a year at the school of advanced engineering in Limoges, ENSIL, with a focus on materials. It was a very good experience, all thanks to the ERASMUS programme.

I also took a course in forensic engineering... Everybody keeps asking me 'what *is* this'? Well, forensic engineering is about searching the origin and causes that produce an accident.

I've had several experiences in the industry: I did an internship at the Center for technology transfer in Limoges, CTTC, where I worked with ceramic materials, and I did my final year internship in a Japanese Company, UBE, based in Castellón. I was in the R&D department, working with polymers.

What is the topic of your PhD and can you tell us about the objectives you have to reach?

I'll give you the official full title! It's 'Development of new membrane materials and new design of catalyst adapted to the membrane reactors'. Reactions and applications are defined within the CARENA project by the industrial partners.



I will personally contribute to this project by developing membranes and catalyst, using sol-gel and solvothermal synthesis.

What do you expect from this PhD?

I'm interested in membrane technologies, and I hope that this PhD will give me the fundamentals to become a researcher in this field. And I'd like to learn work methods, how to be autonomous and how to work in a team too.

Another aspect of this PhD within the CARENA framework is that I'll be working with industrial partners so this will allow me to get a foot in the door of industry. This may help me to find opportunities for a job. It's a real pleasure for me to have been selected for this PhD and to be part of the IEM team. It's a well-equipped institute and I'm working with a dynamic group and a very competent team. I'm really lucky... I will learn a lot.

Thank you Claudia for giving us a glimpse into your brand-new research activities!

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5- Workshop Inorganic Membrane Technology - Advanced Production & Design -

March 27-28th 2012
IEM-CNRS, MONTPELLIER. FRANCE



This workshop is organized by the Institut Européen des Membranes in Montpellier and supported by two European Commission-funded projects : "IMeTI" (Marie Curie Action- People) & "CARENA" (7th FWP- NMP). The main objectives of this joint workshop are to gather industries and SMEs using advanced **inorganic membrane designs** (honeycombs, hollow fibres, tubes, capillaries...) and to gain insights into their potential applications for **gas & vapour separation**, and **membrane reactors**.

Further, the workshop will create a discussion platform between the IMeTI & CARENA consortium members and the audience.

Industry, universities and research centres will learn about the two project's activities related to **inorganic membrane development**

The conference will take place at the auditorium of CNRS Montpellier, next to IEM. The Gala dinner will be organized in town at the Fabre Museum.

Contact: Sadika.Guedidi@iemm.univ-montp2.fr

Leaflet : see Annex

6- Internal Project Steering Committee meetings

The role of the PSC is to carry out day-to-day management . The dates of the meetings are :

- 1 - 29 September 2011
- 2 - 10 January 2012
- 3 - 3 April 2012

7 – Next meeting

*The next annual meeting will be held in
Lyon – France in May 2012.*



Miscellaneous

Strategic Advisory Board (SAB)

In the management structure of CARENA, there is a room for a Strategic Advisory Board (SAB). This board has to be “an independent body consisting of selected persons who are not partners in the CARENA project”. The SAB will advise the Project Steering Committee (PSC) on an annual basis. It will introduce stakeholder requirements into the development of CARENA technologies and products, review the project progress and propose changes to the direction of the project if necessary (as an example because of changes in societal and consumer priorities...) and support the dissemination of the results. (See: Description of Work, briefly DoW). First discussions on this point have been started during the General assembly held at the time of the Kick-Off meeting mid-July 2011. Contacts are continuing under the direction of a small size committee involving the Coordinator, the Project Manager and the Public Dissemination Manager. The CARENA’s SAB will be constituted at the beginning of 2012.

Dissemination plan

A plan for the public dissemination of CARENA results is under construction. A first draft will be as follows:

1. Constitution of the SAB (beginning 2012)
2. Joint IMETI-CARENA meeting (end of March 2012)
3. Further contacts to organize with DEMCAMER (the other IP selected with CARENA in the same Call) and maybe other EU projects related to close thematic (with maybe the idea to give a structure to these relations?) (2012)
4. Organization, with other relevant institutions, of a large workshop (congress?) on “membrane reactors” as a whole (2013 ?)

CARENA Website

<https://www.carenafp7.eu/>

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Workshop

Inorganic Membrane Technology - Advanced Production & Design -

Montpellier (France), 27-28 March 2012

Focus of the Workshop

The main objectives of this workshop are to gather industries and SMEs whose activities make use of advanced **inorganic membrane designs** (honeycombs, hollow fibres, tubes, capillaries...) and to gain insights into their potential applications for **gas & vapour separation**, and **membrane reactors**.

Further, the workshop will create a discussion platform between the IMeTI & CARENA consortium members and the audience.

Industry, universities and research centres will be informed about activities of these projects related to **inorganic membrane development**.

Contact

IMeTI & CARENA Workshop

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E-Mail : Sadika.Guedidi@iemm.univ-montp2.fr



Organizing Committee

Dr. Anne Julbe (*IEM-CNRS*) - Chair
Prof. André Ayrat (*IEM-UM2*) - co-Chair
Dr. Samuel Bernard (*IEM-CNRS*)
Dr. Hugues Blasco (*IEM-CNRS*)
Dr. Rune Bredesen (*SINTEF*)
Dr. Sylvie Condom (*IEM-ENSCM*)
Dominique Diamante (*IEM-CNRS*)
Dr. Martin Drobek (*IEM-CNRS*)
Dr. Marie-Laure Fontaine (*SINTEF*)
Dr. Sadika Guedidi (*IEM-EMH/UM2*)
Prof. Gilbert Rios (*IEM-EMH*)
Ing. Claudia Salvador-Levehang (*IEM-CNRS*)

Workshop Duration

Registration opens at 8:30am on Tuesday 27th, March 2012. The Workshop ends in the afternoon on Wednesday 28th, March 2012.



WORKSHOP

INORGANIC MEMBRANE TECHNOLOGY

- Advanced Production & Design -



27-28 March 2012

IEM-CNRS, MONTPELLIER

FRANCE

IMeTI & CARENA Projects

The IMeTI project (Marie Curie Action "Industry-Academia Partnership and Pathways") aims to broaden an applied research in Implementation of Membrane Technology to Industry in the field of organic solvent nanofiltration and high temperature gas separation using cutting edge technologies based on new membranes.

6 Partners

- Imperial College of Science, Technol. and Medicine, London, UK (Coordinator)
- Evonik Membrane Extraction Technology Ltd, United Kingdom
- Univ. of Chemical Technology and Metallurgy, Sofia, Bulgaria
- CNRS, Institut Européen des Membranes de Montpellier, France
- HYFLUX-CEPARation Technologies, Helmond, The Netherlands
- CNR, Istituto per la Tecnologia delle Membrane, Rende, Italy
- GVS S.p.A., Bologna, Italy

The CARENA project (Large collaborative project) aims to create technologies - CAlytic Reactors based on New mAterials- enabling an efficient conversion of light alkanes and CO₂ into higher value chemicals.

18 Partners

- Energy Research Centre of the Netherlands, The Netherlands (Coordinator)
- Arkema, France
- Akzo Nobel Industrial Chemicals B.V., The Netherlands
- Johnson Matthey PLC, United Kingdom
- CREE StGobain, France
- Acktar Ltd, Israel
- Commissariat à l'Energie Atomique, France
- CNRS- Institut de Recherches sur la Catalyse et l'Environnement de Lyon, France
- CNRS- Institut Européen des Membranes de Montpellier, France
- STIFTELSEN SINTEF, Norway
- Tecnimont KT, Italy
- Linde AG, Germany
- Process Design Center, The Netherlands
- Technion - Israel Institute of Technology, Israel
- University of Salerno, Italy
- University of Twente, The Netherlands
- Diamond Light Source Ltd, United Kingdom
- European Membrane House, Belgium
- Leibniz University of Hannover, Germany

Programme

The workshop will address the following topics: synthesis/development of inorganic membranes; impact of membrane design on performance; heat transfer; stability in operation and membrane lifetime; costs and integration in large scales for selected systems. Focus is given to membranes used for gas and vapour separation/treatment, including catalytic membranes reactors and electrochemical systems.

Presentations will be organized in the 3 following sessions:

- **Industrial/scalable production and design of inorganic membranes & supports**
 - Tubes /multichannel
 - Capillaries /fibres
 - Honeycombs/corrugated supports
- **New inorganic membranes & interface designs**
 - Membranes architecture
 - Membrane precursors design
 - Membrane/support interface
- **Models & prospective designs**
 - Mechanics/heat/mass transfer modelling
 - Hierarchical/sophisticated designs

Anyone interested to attend this event is kindly requested to email us the completed registration form or contact directly the organization committee.

Registration Information

Attendance to the workshop is free of charge and includes lunches & coffee breaks. A contribution of 100 euros (50 euros for students) will be requested for the Gala dinner held on March 27th 2012. All participants are requested to pay for their own travel and accommodation expenses.

A limited financial support will be given to a limited number of participants on a first come -first served basis.

Deadlines

Abstract submission: **15 December 2011**
Registration: 31 January 2012

Venue

The conference will take place at the auditorium of CNRS Montpellier, next to IEM.

The Gala dinner will be organized in town at the Fabre Museum.

Easy access to the conference: by tramway and bus from the train station, or by taxi from Montpellier Méditerranée airport.



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