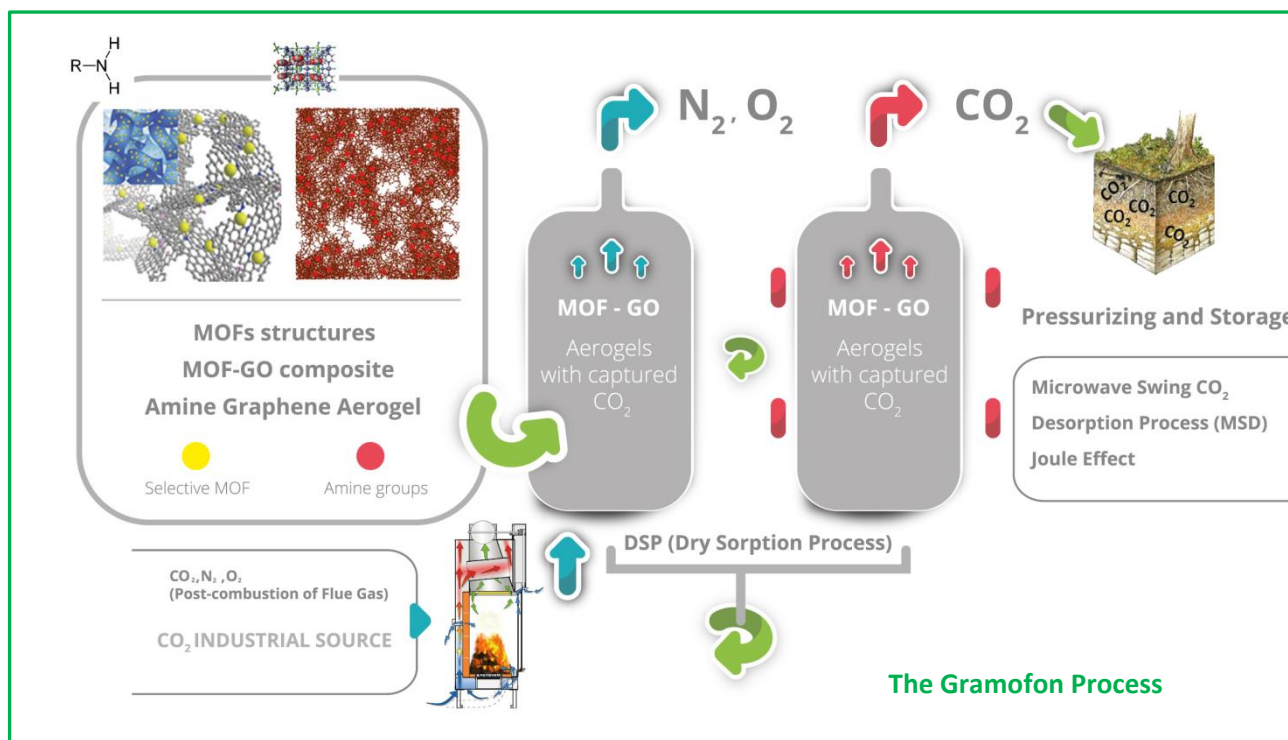




Newsletter

Issue 7 March 2020



So What's been Achieved so far in the Gramofon Project?



1. TECHNICAL ANALYSIS

GRAMOFON project has finished with promising and interesting results for future deployments in industrial applications. Highly efficient CO₂ sorbent materials based on MOFs, MOF/GO composites, and modified GO aerogels has been fully developed. Synthetic routes and critical points for future intensification have been analyzed. These innovative materials are also optimized for different adsorption/desorption technologies. Microwave Swing Desorption (MSD) has been the priority technology. In this way, a laboratory prototype for microwave desorption was built and validated. Instead of this, techno-economical predictions have provided the best indicators for VSA (vacuum swing desorption) against MSD. The potential of sorbent materials developed in GRAMOFON project, compared with

traditional MEA technologies, is very promising, mainly in cement and steel industrial plants.

GRAMOFON implementation has been split in 6 technical workpackages. During this last year WP1 and WP2 have been focused on the shaping of the selected materials (GO aerogels and MOG/GO composites). Once shaping process was optimized, production of the materials were scaled until 200-300g to feed MSD prototype in the WP5. Important conclusion of scale-up is that the reduction of CO₂ capture performance from powder to shaped/scaled materials has been around 10% in the worst cases. The main protagonists in this final year have been WP4 and WP6. In WP4, performance and validation of selected sorbent materials in the microwave prototype has been done, showing important energy savings compared with traditional thermal heating during desorption process. GO has an important influence in energy efficiency, implying a reduction of more than 50% of time and energy required. WP6 has focused on environmental and technoeconomical studies, that were directly related to the main impacts and quantitative objectives initially defined in GRAMOFON project. The cement plant case study has been selected as reference for environmental analysis because it has offered the best estimation and promising of all the industrial cases. Operational impacts comparing traditional MEA capture system in cement plants, with MIL-90/GO and Ni-MOF-74 has shown that the effective global warming potential impact using capture systems reaching reduction values of 15% in MEA technologies, and between 40-50% with GRAMOFON technologies. A Class 4 economic analysis has been performed for commercial-scale VSA with materials produced in GRAMOFON and for coal-fired power plant, cement and steel plants. MEA absorption had been analysed as reference case. The results shown that the cement and steel sectors are particularly interesting targets for the adsorbents produced in GRAMOFON. Several indicators have shown promising values, for example, CO₂ avoidance cost, with reduction till 40% in cement plants respect to traditional MEA processes. This is because their flue gases have a relatively high CO₂ concentration, and because low-pressure steam is relatively cheap in a power plant, favouring the reference technology (MEA absorption).

2. DISSEMINATION ACTIVITIES:

a. WORKSHOP en Valencia:

The 7th November 2019 it was celebrated a training workshop in Valencia (Spain), with a participation of around 50 people, to present GRAMOFON results and

technologies in CCS and other technologies in CCS and CCU. In the training workshop participated speakers from the Spanish Government, presenting Penalties in CO2 emissions; from the Spanish H2020 National Contact Point they presented EU grants to R&D projects in CCS and CCU, and several speakers from UPV, LEITAT, UMONS and AIMPLAS who presented different technological solutions.



Agenda:

<https://www.formacion.aimplas.es/Documentos/2019/Jornada%20Captura%20CO2/AGENDA.pdf>

b. WORKSHOP in Breda:

Presentations: <https://www.process-design-center.com/training-event-ccus-2020/>

For more than 30 people, a workshop with different presentations was celebrated in Breda (Netherlands) on 19th February 2020. In the agenda, there were several presentations in CO2 global warming scope (awareness and policy), capture, utilisation and storage technologies. Several speakers participated from ARBON university, TNO, VITO, Université de Mons and Process Design Centre.



Aim: provide broad training

- CARBON**
 - CO₂ and global warming: awareness, policy
Johan Raap, former lector at Avans University of Applied Sciences
- CAPTURE**
 - Pre-combustion
Jurriaan Boon, TNO, unit EnergieTransitie
 - Post-combustion
Raf Roelant, PDC
 - Direct from air
Metin Bulut, VITO
- UTILISATION**
 - Utilisation solutions
Guy De Weireld, Université de Mons
- STORAGE**
 - Storage
Filip Neele, TNO

→ GRAMOFON members

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c. WORKSHOP in Belfast (UK)

Last 27th February 2020 the workshop “Fighting CO₂ emissions: Next Generation Solutions” was celebrated in Belfast (UK) with the participation of more than 30 people. During the meeting several speakers from Queens University of Belfast, the National University of Ireland (Galway), Tecnalia, the University of Manchester and from the organiser, MOF Technologies, presented different technologies in decarbonisation, CO₂ separation, different uses of MOFs, membranes, and the effects of CO₂ impurities.



d. FINAL CONFERENCE.

A final conference was organised for the 25th March with project results presentation and several contributors of interest in the areas of GRAMOFON technologies. Nevertheless, the celebration of this event was frustrated by COVID – 19 crisis in Europe.

Instead of this Final Conference, some webinars and presentations have been disseminated in Gramofon website e-learning area: <https://gramofonproject.eu/e-learning.php>



For more information: www.gramofonproject.eu



This publication reflects only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727619