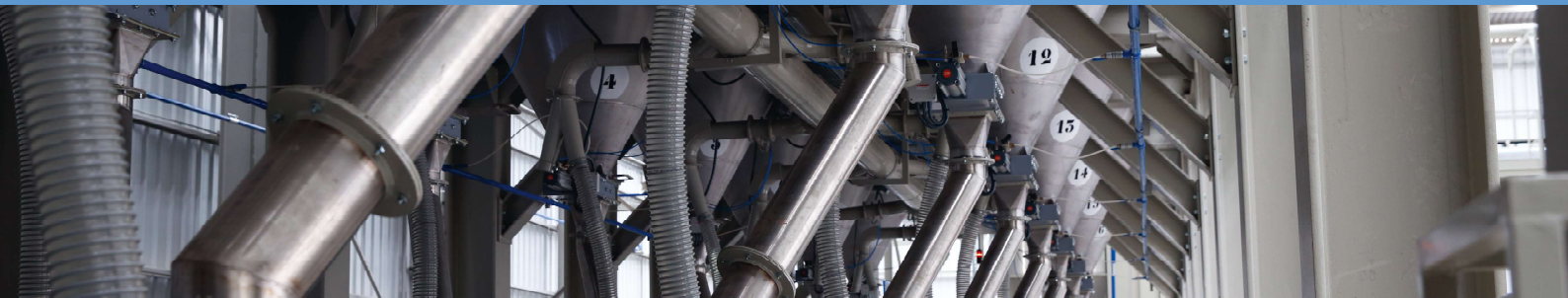


Development of an Efficient Microwave System for Material Transformation in energy INTensive processes for an improved Yield



Enjoy reading the DESTINY newsletter!

The DESTINY project, started in October 2018, is fully deploying its actions. It aims at developing and demonstrating a new concept of firing for granular feedstock to realize material transformation using full microwave heating as alternative energy source and complement to the existing conventional production to improve performance of the industrial processes in the Cement, Ceramics and Steel industrial sector.

The third issue of the DESTINY newsletter will provide technical updates about the project progresses, the several deliverables submitted as well as the scientific publications published by the consortium.

TECHNICAL UPDATES ON THE DESTINY PROJECT

During the first 18 months of activities, very relevant advances on DESTINY project were made. The main developments that have been addressed focuses on three aspects: the new microwave-based technology, the selected products and raw materials, as well as the new processing of DESTINY.

The requirements of production were collected and summarized to the new DESTINY processing based on microwave technology. The wide campaign of analysis of dielectric properties, as well as the compositional characterization of the raw materials and products, allowed identify the main indicators for the microwave treatment.

With the new progress in the frame of simulation, design, development, construction and configuration of a microwave applicator, as well as the adaption in the conveying system to the feedstock, has been reached the target temperature for the materials selected.

Ceramic pigments demand a very flexible performance due to the wide complexity and variety of the reactions. In the case of calcined clays for cement the demand is more focused in the productivity rate under stable conditions. On the other hand, intermediate iron product recovery from recycling of the steel sector have also specific requirements in solid and gases treatment.

In the upcoming months, priority will be given to the incorporation of the advances in process monitoring and control, as well as in the efficient integration of microwave process with conveying system to improve the quality of the product, particularly at upscaled level.



DELIVERABLES SUBMITTED

In this period a total of 10 confidential and public deliverables were successfully submitted.

The public documents finalized are the following:

- **KERABEN: D1.1 - Quality assurance, risks & data management plan.**

The document describes the management bodies and procedures set for assuring the best level of quality in work processes and in the reporting process (deliverables), to define how risks must be identified/monitored/mitigated and to provide guidance for the data management procedures. It serves as a reference for all related project members in order to identify their roles & responsibilities and how to address any eventuality.

- **UNIVERSITAT POLITECNICA DE VALENCIA: D2.1 - Electromagnetic characterization of raw materials.**

This deliverable describes the raw materials provided for each sector and how UPVLC has measured the samples dielectric properties as a function of temperatures.

- **CIAOTECH: D6.1 - Market Study.**

This document envelopes all the activities related to market and innovation trends in cement, ceramic and steel sectors. It is the foreword to the Stakeholder Analysis, aiming to better engage them during and after the project. The final objective is ensuring a large exploitation and market penetration for microwave technology-based plants and other relevant exploitable results from the project.

PUBLICATIONS

The consortium is publishing articles and papers regarding the DESTINY project, its developments and progresses, in specialized journals in the cement, ceramic, steel and process technology sector in Europe, in the frame of its dissemination strategy. UNIVPM is leading the coordination of this action and below is reported a list of the publications issued in the first 18 months of activities.

- V.L Guaita Delgado, A.M. Lopez Buendia, G.M. Revel, J.M. Catala Civera, A. Felis Rios, O. Centelles Vilalta, T. Hauck, L. Schmidt, C. Hillman, A.F. Santos, M. Molica Colella, K. Van Reusel, J. C. Fernandes Pereira, M. Founti, *DESTINY project: Efficient microwave system for material transformation in energy intensive processes*, poster in the 17th International Conference on Microwave and High Frequency Heating (AMPERE 2019) Valencia, Spain, September 9-12, 2019.

- V.L Guaita Delgado, A.M. Lopez Buendia, G.M. Revel, J.M. Catala Civera, A. Felis Rios, O. Centelles Vilalta, T. Hauck, L. Schmidt, C. Hillman, A.F. Santos, M. Molica Colella, K. Van Reusel, J. C. Fernandes Pereira, M. Founti, *Eco-Efficient Electrical Processing In Energy Intensive Industry With High Temperature Microwave Kilns: The DESTINY Project*, poster in the 16th World Congress on Ceramic Tile Quality (QUALICER 2020) Castellón, Spain, February 10-11, 2020.

- B. García-Baños, J.L. Godes, A. Felis, P. Plaza-González, *Microwave Synthesis Of Mixed Metal Oxides With In Situ Dielectric Characterization*, poster in the 17th International Conference on Microwave and High Frequency Heating (AMPERE 2019) Valencia, Spain, September 9-12, 2019.

- Public Funded Project within the AMPERE Community: *Development of an Efficient Microwave System for Material Transformation in Energy Intensive Processes for an Improved Yield* (DESTINY) (no authors) Ampere Newsletter, Issue 101 - January 31, 2020.

- Duarte M.S. Albuquerque, Ricardo M.S. Mimoso, José C.F. Pereira, *Rotation Effects And Improving Heating Uniformity In A Microwave Cavity For Continuous Ceramic Frit Melting*, poster in the 17th International Conference on Microwave and High Frequency Heating (AMPERE 2019) Valencia, Spain, September 9-12, 2019.

- D. Giannopoulos et al., *Improved Manufacturing Through Continuous High Temperature Microwave Process: The Destiny Project*, poster in the 9th International Symposium on Radiative Transfer, RAD-19, Athens, Greece, during 3 - 7 June 2019.

THE THERMAL FOOTPRINT OF COVID-19



Luis Guaita
DESTINY Project Coordinator

At present, we all are living tough times on a global scale. A novel virus, the coronavirus disease 19 (COVID-19), is spreading rapidly across the globe causing an emergency and alarm situation with few and distant precedents in time. Nobody knows if the effects will be comparable to the ones caused by the last global pandemic of the H1N1 virus in 1918 –also known as Spanish Flu– with terrible consequences, but that does not make it any less important. Fortunately, today the world is very different.

The COVID-19 is a highly transmittable and pathogenic viral infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which emerged in Wuhan, China. Extreme measures are being implemented by governments worldwide, since the rapid human to human transfer and significant mortality factor has been confirmed and there is no clinically approved antiviral drug or vaccine available yet.

The impact of the virus is not only a serious threat to people's health, the experts say it may also be the source of a crisis with similar dimensions to the 2008 financial crisis. During the last weeks the COVID-19 is forcing business and institutions to cancel travels, events, unnecessary activities and switching to teleworking, in hope of slowing the pandemic.

Common actions are needed now. I would like to refer to the words of the EU High Representative/Vice-President Josep Borrell, last Friday 27 of March in Brussel that state: "EU and its Member States will do everything they can, everything necessary to overcome the coronavirus crisis. We will do it together, in solidarity and for the benefit and protection of our citizens. For that, we are taking measure, measures needed first to limit the spread of the virus and to provide urgent assistance to those in need."

Research is needed now more than ever. A global challenge like the current COVID-19 pandemic can only be defeated when all stakeholders work together: scientists, health workers, publishers, funders, policymakers, and government officials.

The positive point is the thermal footprint of COVID-19. Greenhouse gasses like CO² emissions the heat from the Sun in the Earth's atmosphere increasing global temperatures. But in the past two months, it seems that Coronavirus is causing a fall in global CO² emissions and a fall in pollutants concentration, likely due to the industry slowdown as the world battles the new Coronavirus. This is a positive environmental improvement but if look back, reductions in greenhouse gas emissions took place in the 1918 Spanish influenza outbreak, oil shocks of the 1970s, and the 2008 financial crisis. But they didn't last long. As soon as the economy recovers the emissions will increase again.

The participants in the DESTINY project are aware of the importance of the challenge our society is facing and committed in development of new energy-efficient technologies that allow the Industry to change its paradigm towards a model based on sustainability. Although our activity is temporarily slowing down, as soon as possible we will be back working hard in order to be able to achieve our goals on schedule and deliver interesting results for the industry, the scientific community and society.

Meanwhile it is important to follow the recommendations of the authorities and learn what is COVID-19 virus really teaching us? Recently in a beautiful message Bill Gates said that COVID-19 is reminding us that: we are all equal, we are all connected, how precious our health is, the shortness of life and of what is most important for us to do, how materialistic our society has become, how important our family and home life is, our true work is to look after each other and to be of benefit to one another, to keep our egos in check, the power of freewill is in our hands, we can be patient or we can panic, this can either be an end or a new beginning, Earth is sick, after every difficulty there is always ease.

Stay safe.

The Project Coordinator,
Luis Guaita

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For more info about project visit the DESTINY website at: www.destinyh2020andbeyond.eu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 820783.

