

MULTI-site organic-inorganic HYbrid CATalysts for MULTI-step chemical processes

Enjoy Reading our first Biannual MULTI2HYCAT Newsletter in 2020

Welcome to our first biannual newsletter in 2020 where we inform you about the progress and MULTI2HYCAT achievements made in the last 6 months (Q3/Q4 2019) and give an outlook to the upcoming six-month period.

Summary and Highlights

- **Preparation of the industrial workshop in Brighton (FEZA conference)**

The industrial workshop will take place on 14 July in Brighton, to which all interested organisations are cordially invited.

- **7th biannual project meeting held in Rome (IT) in January 2020.**

The 7th biannual MULTI2HYCAT project meeting was hosted by CiaoTech and held after 36 project months in Rome, where the latest achievements were discussed.

- **Dissemination activities**

In the last 6 months *three new scientific publications* have been issued. Moreover, the consortium attended *five conferences*, and Ramon Rios (UoS) *was invited as a visiting professor at three universities in China and two in South Korea*. The *website* has been continuously updated.

- **EC reporting**

5 deliverables were uploaded to the EU Participants Portal.

- **Stakeholder Online Survey is still [online](#).**

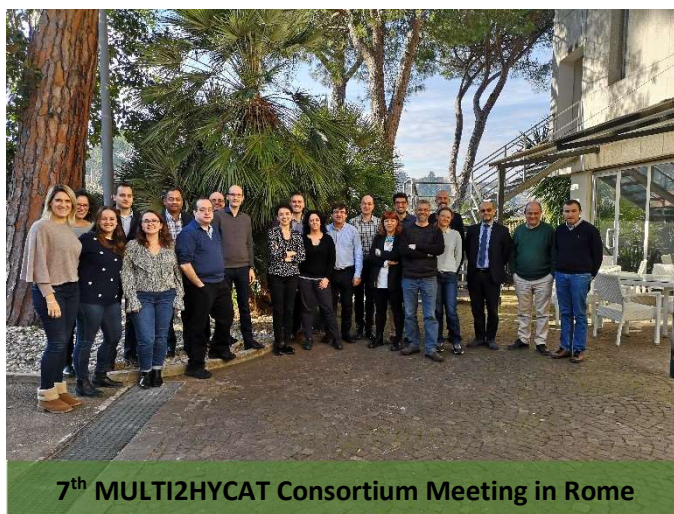
This survey aims at collecting the opinions of specialists from the fields of catalysis, pharmaceutical chemistry and process engineering towards the MULTI2HYCAT approach and the future of chemical industry.

Your opinion is important to us! Please take part in this survey – your answers will allow us to better meet your expectations.

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7th Biannual Project Meeting

On 16 and 17 January the MULTI2HYCAT Consortium met in Rome to expose the progress made during the previous 6 months. This time the focus was strongly set on two core aspects: on the one hand, a precise roadmap for the last year of the project was drawn up in order to achieve 100% of the remaining project goals, and on the other hand, special emphasis was laid on exploitable results. Therefore, the meeting was split in two main sessions. On the first day the advances and the remaining tasks of the project were discussed, while the second day focused on exploitation including preparatory works for the industrial workshop.



Here is a brief summary on the research progress:

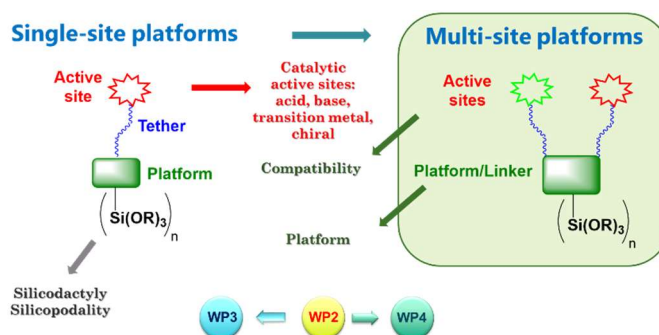
Since the last meeting, **five deliverables** were uploaded to the EC participant portal.

While in the first period monomer precursors in the organic-inorganic hybrid catalysts have been analysed and identified, the second period of the project (M19-M36) was centred in the development of multi-site hybrid catalysts. First of all, several synthetic strategies were explored in order to produce a multi-site platform to be anchored on different inorganic supports. All the multi-site platforms were firstly tested in catalytic reactions in their homogeneous forms in order to evidence the more suitable platform.

Multi2hycat successfully synthesised 3 different multi-site platforms, starting from different single-site platforms:

- The 1st Generation is a s-Triazine based platform
- The 2nd Generation is based on BAM-BINAP derivatives. This platform showed potential catalytic application in cascade reactions
- and the 3rd generation is based on Enantioselective catalysis

Simultaneously, the research activity continued on the development of mono-functional Pd-based hybrid catalysts. The synthesised Pd-based hybrid catalysts evidenced good catalytic performances in Suzuki reaction and good recyclability and are now in the scale-up process. The synthetic research activity was supported by experimental and computational physicochemical characterisation in order to evidence the surface properties of the inorganic supports and the nature of active sites of the multi-site hybrids.



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In addition, the research activity on acid or basic catalysts has been pursued and the mono-functional and multi-functional catalysts and hierarchical porous acid catalysts were catalytically tested.

The second day of the project meeting was focused on the exploitation part of the project results. First, we discussed the upcoming industrial workshop, and then we focused on the exploitable results itself. After revision of all the exploitable results of the project, three key exploitable results (KERs) have been selected for re-evaluation. The parties involved then discussed various aspects related to the exploitation of these results in smaller groups. Since a patent for one of the process optimisation processes is envisaged, the consortium also discussed measures to avoid possible patent infringement.



Finally, we agreed, that our next biannual meeting will be hosted by Rhodia and will coincide with the industrial workshop in Brighton.

Industrial workshop at FEZA conference 2020

In order to engage the different stakeholders even more in the project, an industrial workshop is scheduled for July 14th 2020. All partners agreed that the most effective way to achieve maximum impact and engagement is to combine the Industrial Workshop with a relevant conference. After considering various possible conferences, the consortium decided to organise the Industrial Workshop in the frame of the 8th Conference of the Federation of European Zeolite Associations (FEZA 2020) in Brighton (UK, 12-15 July 2020).

FEZA and MULTI2HYCAT will co-organize a specific industrial workshop where MULTI2HYCAT will have the possibility to have its own session. The focus of the industrial workshop at FEZA will be in presenting all results achieved so far by MULTI2HYCAT to an audience of industrial organizations, which are potentially interested in developing them further and opening up market opportunities.

So, if your organisation is already present at the FEZA conference you are cordially invited to attend the workshop. At the conference there will be a detailed description on how to get access. Moreover, MULTI2HYCAT will invite additional relevant stakeholders.



Dissemination activities

The MUTI2HYCAT consortium published 3 more scientific publications related to the preparation, characterisation, modelling and application of hybrid catalysts. In total, 14 publications have been issued during the project so far, while the original goal was 6. Moreover, the partners attended five conferences, and Ramon Rios from the University of Southampton was invited as visitor lectures in at five universities.

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Articles

- **Hybrid catalysts based on N-heterocyclic carbene anchored on hierarchical zeolites**
Enrica Gianotti, Ivana Miletto, Chiara Ivaldi, Geo Paul, Leonardo Marchese, Marta Meazza, Ramon Rios and Robert Raja; *RSC Adv.*, 2019,9, 35336-35344; <https://doi.org/10.1039/C9RA07516J>
- **Expandable Layered Hybrid Materials Based on Individual 1D Metalorganic Nanoribbons**
Jose Maria Moreno, Alexandra Velty and Urbano Diaz; *Materials* 2019, 12, 1953.; <https://doi.org/10.3390/ma12121953>
- **Acid properties of organosiliceous hybrid materials based on pendant (fluoro)aryl-sulfonic groups through a spectroscopic study with probe molecules**
Andrea Erigoni, Geo Paul, Marta Meazza, María Consuelo Hernández-Soto, Ivana Miletto, Ramon Rios, Candela Segarra, Leonardo Marchese, Robert Raja, Fernando Rey, Enrica Gianotti and Urbano Díaz; *Catal. Sci. Technol.*, 2019,9, 6308-6317; <https://doi.org/10.1039/C9CY01609K>

Conferences

- **Molecular and materials simulation at the turn of the decade: Celebrating 50 years of CECAM**, 9-12 September, Lausanne (Switzerland); one contribution: <https://cecam50.cecam.org>
- **19th International zeolite conference**, 7-12 July, Perth (Australia); one contribution: www.izc19.com
- **SECAT 2019 - Catalizadores básicos organosilíceos: Síntesis, caracterización y actividad Catalítica**, 24-26 June, Córdoba (Spain), one contribution: <https://www.secat19.com/>
- **CIS 8 - Organosiliceous hybrid materials: synthesis, characterization and catalysis**, 11-14 July; Amantea (Italy); <http://cis8.unical.it/>
- **XIIth International School on Organometallic Chemistry “Marcial Moreno Mañas”**; 14 June; Castellón (Spain); <http://isoc-mmm2019.com/>

Invited lectures

From May 2019 to July 2019 Ramon Rios was invited as a visiting professor at three universities in China and two in South Korea:

- Jiangxi Normal University (Nanchang, CN)
- East China Normal University (Shanghai, CN)
- Fudan University (Shanghai, CN)
- Chonbuk National University (Jeonju, KR)
- Sungkyunkwan University (Seoul, KR)

Ramon Rios, a professor from the University of Southampton, gave lectures on current research progress in the field of catalysis, and in particular on the MULTI2HYCAT approach for more efficient catalysts. His lectures were aimed primarily at PhD students and the scientific staff of the different universities.

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Stakeholder Engagement – Participate in our Online Survey

In order to involve industrial and academic stakeholders from outside, the MUTI2HYCAT consortium launched an online stakeholder survey last year. The stakeholder online survey can be found on the project [website](#).

Please participate in our online survey since your personal opinion is important for us! Based on your answers, we want to identify the innovation potential for the chemical industry on the one hand and better meet your expectations on the other hand.

This survey should not take longer than 10 minutes. Thank you for granting us your time!

Upcoming events


Below you will find a list of future interesting events which also might be attended by the MULTI2HYCAT partners. The industrial workshop will coincide with the FEZA conference.

- ✚ International Conference on Chemical Engineering and Catalysis, 19-20 March 2020 (Berlin, Germany)
- ✚ International Green Catalysis Symposium, 30 March-2 April 2020 (Rennes, France)
- ✚ Global Conference on Catalysis and Chemical Engineering Conference, 20-22 April 2020 (Toronto, Canada)
- ✚ 3rd Edition of EuroSciCon Conference on CHEMISTRY, 27-28 April 2020 (Rome, Italy)
- ✚ CHEMUK 2020, 13-14 May 2020 (Manchester, UK)
- ✚ EUROPACT, 18-20 May 2020, (Copenhagen, Denmark)
- ✚ Chemspec Europe 2020, 27-28 May 2020 (Cologne Germany)
- ✚ Catalysis (GRS), 27-28 June 2020 (New London, US)
- ✚ Advancing Sustainable Technologies Through Catalysis (GRS), 28 June-3 July 2020 (New London, US)
- ✚ 17th International Congress on Catalysis, 14-19 June 2020 (Sane Diego, California)
- ✚ **FEZA congress, 12-15 July 2020 (Brighton): the Industrial workshop will be on day 14**
- ✚ The Curious2020 – Future Insight Conference, 13-15 July 2020 (Darmstadt, Germany)
- ✚ GREENCHEM, 16-17 July 2020 (Las Vegas, USA)
- ✚ 11th World Congress of Chemical Engineering (WCCE11), 5-9 September 2021 (Buenos Aires, Argentina)

This is only a preliminary list for 2020. Visit the event section of our website regularly and find out more about the type, the titles and our people presenting at the different events!

Contact Us

You can't make it to the events? Do you have ideas or want to partner with us? Are you interested in details or have questions? Whatever you desire, you can contact us at any time using one of the channels below. Looking forward to your message and your participation in our survey!

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For more info about the project visit the MULTI2HYCAT website at: www.multi2hycat.eu  MULTI2HYCAT



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