SIMPOSIO NACIONAL DE QUÍMICA ORGÁNICA
CÓRDOBA - ARGENTINA 2021

23
3er
VOM
SINAQO XXIII

Estimados colegas,

Los invitamos a participar del último Ciclo de Conferencias virtuales denominados XXIII SINAQO - Virtual Opening Meetings (VOMs), previos al XXIII SINAQO. A continuación, les hacemos llegar el programa del **3er VOM: "Sustainable Science in Organic Chemistry- Ciencia Sustentable en Química Orgánica"** a realizarse el día 22 de septiembre del corriente:

9:55 - 10:00 am (ARG): Apertura a cargo del Dr. Juan E. Argüello, moderadora Dra. Gabriela Oksdath-Mansilla.

10:00 - 10:40 am (ARG): Conferencia Dr. Kyle E. Cordova, "*The chemistry of reticular materials for carbon dioxide capture, regeneration, and conversion*" (Royal Scientific Society, Amman, Jordan).

10:40 - 11:20 am (ARG): Conferencia Dr. Antonio Procopio, "*Semi-synthesis as a tool for broadening the health applications of bioactive olive secoiridoids*" (Department of Health Sciences, Magna Graecia University, Catanzaro, Italy).

11:20 - 12:00 am (ARG): Conferencia Dra. Anabel Lanterna, "*Heterogeneous photocatalysis for sustainable organic transformations*" (School of Chemistry and Green Chemistry Beacon, University of Nottingham, UK).

12:00 am (ARG): Cierre y presentación del XXIII SINAQO (15 al 18 de noviembre).

¡Esperamos contar con su participación!!! Los saludamos cordialmente,

Comisión Organizadora

XXIII SINAQO

THE CHEMISTRY OF RETICULAR MATERIALS FOR CARBON DIOXIDE CAPTURE, REGENERATION, AND CONVERSION

Dr. Kyle E. Cordova

Executive Director of Scientific Research / Assistant to Her Royal Highness Princess Sumaya bint El Hassan for Scientific Affairs

Royal Scientific Society

The carbon dioxide challenge is one of the most pressing problems facing our planet. Each stage in the carbon cycle — capture, regeneration, and conversion — has its own materials requirements. Recent work has demonstrated the potential of reticular chemistry and the effectiveness of reticular materials, such as metal-organic frameworks (MOFs) and zeolitic imidazolate frameworks (ZIFs), for addressing this challenge. In this presentation, I will demonstrate our success in rationally and systematically modulating the interplay between the structures of reticular materials and the desired output chemical properties in order to achieve exceptionally selective capture and effective catalytic conversion of carbon dioxide to value-added products. I will demonstrate how the interior of reticular materials can be designed with a level of precision that is crucial for the development of the next generation of carbon dioxide adsorbents as well as higher-performing catalysts for carbon dioxide conversion. To realize a total solution, I will argue the case that the precision of reticular chemistry is essential for building more complex materials to address selectivity, capacity, and conversion together in one material.

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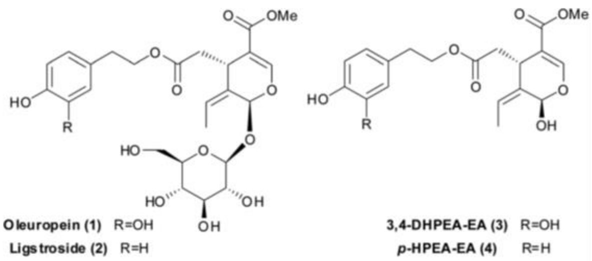
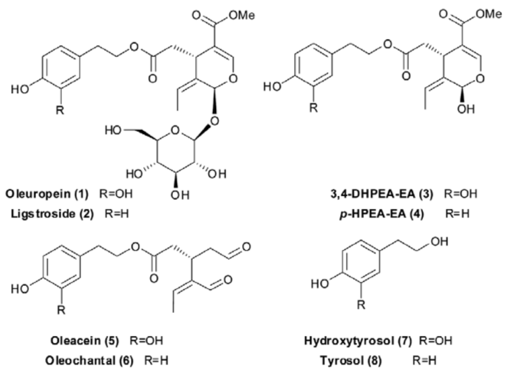
SEMI-SYNTHESIS AS A TOOL FOR BROADENING THE HEALTH APPLICATIONS OF BIOACTIVE OLIVE SECOIRIDOIDS

Dr. Antonio Procopio

Dipartimento di Scienze della Salute, Università "Magna Græcia" di Catanzaro, Viale Europa - Campus Universitario "S. Venuta" - Loc. Germaneto, 88100 (CZ), Italy

Numerous studies indicate that the consumption of extra virgin olive oil (EVOO) is associated with a lower risk of cardiovascular diseases, metabolic syndromes, type 2 diabetes and neurodegenerative diseases.[a] These beneficial effects on human health have been attributed mainly to the phenolic compounds found in the olive plant so that,[b] a few years ago, the European Food Safety Authority (EFSA) recognized a direct relationship between certain olive oil phenols and the protection of low-density lipoprotein (LDL) particles from oxidative damage.[c] According to the EFSA claim, "*olive oil polyphenols contribute to the protection of blood lipids from oxidative stress*", specifying that "*the claim may be used only for olive oil containing at least 5 mg of hydroxytyrosol and its derivatives (e.g. oleuropein complex and tyrosol) per 20 g of olive oil*".





Chemical structures of olive oil bioactive phenols responsible for the beneficial effects recognized by the EFSA claim

In the last twenty years, numerous efforts have been dedicated to the study of each of these individual compounds, many of which are currently available through synthetic and semi-synthetic approaches.[4]

References

a- N. R. Sahyoun and K. Sankavaram "Historical origins of the Mediterranean Diet, Regional Dietary Profiles and the Development of the Dietary Guidelines, in Mediterranean Diet" Springer, Cham, Switzerland, **2016**, vol. 56.
b- G. K. Beauchamp, R. S. J. Keast, D. Morel, J. M. Lin, J. Pika, Q. Han, C. H. Lee, A. B. Smith P. A. S. Breslin *Nature*, **2005**, *437*, 45.
c- European Community, Council Regulation No. 432/2012 of 16 May 2012 establishing a list of permitted health claims made on foods, other than those referring to the reduction of disease risk, to children's development, health, *Off. J. Eur. Union*, **2012**, *L136*, 1.
d- M. Oliverio, M. Nardi, M. L. Di Gioia, P. Costanzo, S. Bonacci, S. Mancuso, A, Procopio "Semi-synthesis as a tool for broadening the health applications of bioactive olive secoiridoids: a critical review" *Nat. Prod. Rep.*, **2021**, *38*, 444.

HETEROGENEOUS PHOTOCATALYSIS FOR SUSTAINABLE ORGANIC TRANSFORMATIONS

Dr. Anabel E. Lanterna MRSC[1]

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The pharmaceutical industry is continually seeking new avenues to develop drugs producing less toxic waste and by-products. Catalysis plays a key role in the chemical sector, where ca. 85% of the manufacturing process involves at least one catalytic step, and not seldom, this is a hydrogenation reaction. Common catalytic hydrogenation methods depend on the use of precious metals, elevated temperatures and high H_2 pressures (or harsh H donors), making the process powerful but unsustainable. Here, I will show our efforts to developing sustainable hydrogenation processes by 1) eliminating the use of harsh conditions and 2) moving towards replacing precious metals.

The use of heterogeneous photocatalysis allows catalytic transfer hydrogenations (CTH) under ambient conditions. Our examples show that high H_2 pressures can be replaced by mild H sources such as solvents. This is, photoexcited holes on semiconductor materials are highly electrophilic and able to activate C–H bonds under mild reaction conditions. Meanwhile, excited electrons can form H from the resulting H^+ leading to H_2 gas generation or (CHT) (Figure 1). Although the reduction step usually relies on the use of precious metals such as Pd or Pt, our work suggests that Co-MoS_2 species bear the potential to substitute these metals. In this presentation, I will discuss our recent developments on the use of heterogeneous photocatalysis in CHT using solvents as H source and the replacement of Pd catalysts by nonprecious Co and Mo elements. Part of the study is centred on the selective semi-hydrogenation of internal and terminal alkynes triggered by Co-MoS_2 structures, and the selectivity of the process is rationalised by studies at the single molecule level. This work constitutes the first steps towards the use of earth-abundant materials for applications in heterogeneous photocatalysis as a promising approach that adds to the easy separation and potential reusability of the catalyst the advantage of developing economically and environmentally friendly methodologies.

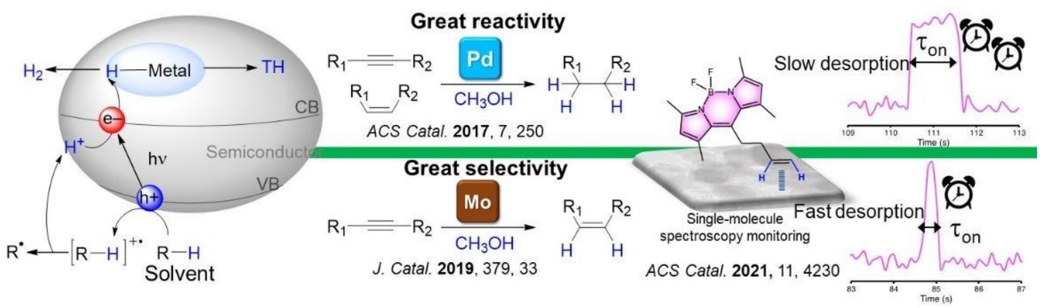

Figure 1. Light-induced catalytic transfer hydrogenation using Pd- and Mo-based co-catalysts.

[1] Work performed at the Scaiano group, University of Ottawa. Co-authors: Bowen Wang, Juan C. Scaiano.