FKKT | UNIVERZA V LJUBLJANI
Fakulteta za kemijo in kemijsko tehnologijo

VABILO NA PREDAVANJE
V OKVIRU DOKTORSKEGA ŠTUDIJA
KEMIJSKE ZNANOSTI / INVITATION TO THE
LECTURE WITHIN DOCTORAL PROGRAMME IN
CHEMICAL SCIENCES

Prof. Giulia Licini

Dipartimento Scienze Chimiche,
Università di Padova, Italy

z naslovom / title:

Vanadium Catalyzed Aerobic Oxidations, from Models to Biomass Valorization

v sredo, 29. 1. 2025 ob 15. uri
v predavalnici 1 v 1. nadstropju Fakultete za kemijo in kemijsko tehnologijo, Večna pot 113 ***/***
on Wednesday, 29. 1. 2025 at 15.00
in lecture room 1, 1st floor at the Faculty of Chemistry and Chemical Technology, Večna pot 113

Vljudno vabljeni! / Kindly invited!

Večna pot 113,
1000 Ljubljana, Slovenija
T: +386 1 479 84 00
dekanat@fkkt.uni-lj.si
www.fkkt.uni-lj.si

Abstract:

The growing shortage of fossil resources leads to the search of a "greener" alternative for high-value chemicals production. The exploitation of biomass waste materials, in particular lignin, is proposed as a valid solution for the replacement of current non-renewable sources. However, the complex and irregular structure of this biopolymer difficult the obtention of target aromatic organic molecules. Most of the traditional lignin degradation catalytic methods use harsh conditions without reaching high levels of selectivity. However, in recent years the research developed facing several combined approaches including homogeneous and heterogeneous catalysis, photocatalysis and biocatalysis for obtaining selective depolymerization of lignin under milder conditions.1

Our group has been involved in the synthesis and use of aminotriphenolate metal complexes (TPA) as catalysts because they are effective in important reactions like polymerizations, olefin metathesis, CO2/epoxide cycloadditions, and oxygen transfer processes.2 More recently the vanadium TPA complexes has been used as redox-catalysts for the aerobic oxidative cleavage of oxygen containing compounds (1,2-diols,2 lignin models and lignin itself).
The catalytic system has been found effective not only under thermo-catalytic conditions in organic solvents and aqueous micellar conditions, but it can be activated by led visible light (Figure 1).3,4 Optimization of the reaction protocols and applications of the catalytic system to a series of substrates of increasing complexity together with reaction mechanism studies will be presented as well as preliminary results on lignin samples.

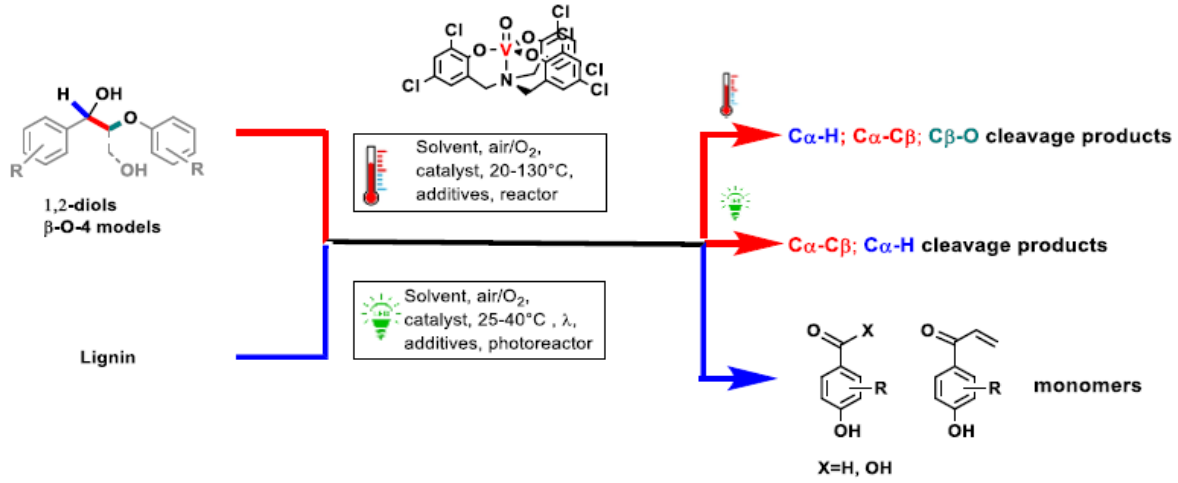

Figure 1. (V)-TPAs aerobic oxidation of lignin models and lignin under thermo and photocatalytic conditions

References.
1. Palumbo, C.T., Ouellette, E.T., Zhu, J. et al. *Nat Rev Chem*, **2024**, *8*, 799–816; Wu, X.; Luo, N.; Xie, S.; Zhang, H.; Zhang, Q.; Wang, F.; Wang, Y *Chem. Soc. Rev.,* 49, (2020) 6198.. 2. Bae, D.Y., Kim, Y., Cha, J., Lee, E. *Coord. Chem. Rev.*, 419 (2020) 213402; 3. Amadio, E.; Di Lorenzo, R.; Zonta, C.; Licini G. *Coord. Chem. Rev.* 301-302 (2015), 147; 4. Amadio, E.; González-Fabra, J.; Carraro, D.; Denis, W.; Gjoka, B.; Zonta, C.; Bartik, K.; Cavani, F.; Solmi, S.; Bo, C.; Licini, G. *Adv. Synth. Catal.* 360 (2018), 3286; 5. Carpentier, R., Denis, W., Sanz Azcona, F., Carraro, D., Grauwels, G., Orlandi, M., Zonta, Licini, G., Bartik, K. ACS Sustainable Chemistry and Engineering, 11 (2023) 8633.

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