

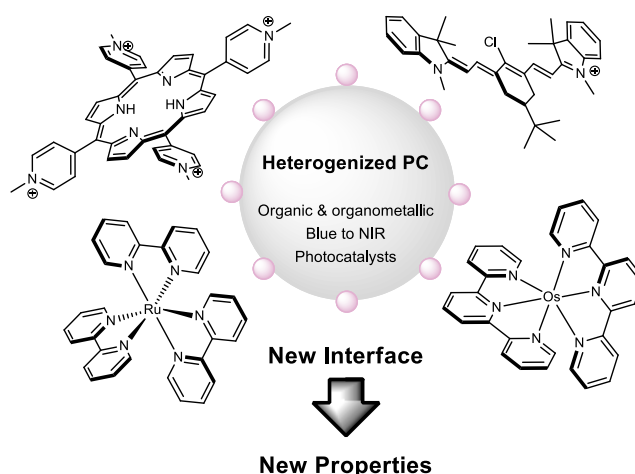
From Interface Engineering to Wavelength Control: Selective Photocatalytic Oxidations

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In this research seminar, we present our group's recent advances in the development of heterogenized photocatalytic systems for selective oxidation reactions. Central to our approach is the creation of well-defined catalytic interfaces through simple and scalable heterogenization strategies, enabling the use of green solvents while simultaneously enhancing catalyst reactivity, robustness, and long-term stability. These engineered interfaces provide a versatile platform for efficient photo-oxidation under mild and sustainable reaction conditions.

Beyond catalyst design, control over interfacial phenomena is extended to the reactor level through the implementation of continuous-flow processing. Flow photoreactors offer precise control over mass and heat transfer, as well as improved photon management, allowing these heterogenized systems to operate at significantly higher space-time yields. As a result, photo-oxidation reactions can be performed with unprecedented productivity, reproducibility, and scalability.

Finally, an additional level of control is achieved by tuning the excitation wavelength across the visible spectrum and toward lower-energy photons in the near-infrared (NIR) region. Access to wavelength-selective photoactivation enables new photo-oxygenation pathways and unlocks levels of chemoselectivity that are inaccessible under conventional higher-energy irradiation. Together, the combined control of catalytic interfaces, reactor architecture, and light energy establishes a unified strategy for highly selective and efficient photocatalytic oxidation processes.



For key references from our group, see: a) Amara, Zimmerlin, Atakpa, Al Ayi, Lancel, *ACS Inorg. Org. Chem. Au*, **2026**, 6, 8–22 ; b) Al Ayi, Atakpa, Arab, Lancel, Amara, *Eur. J. Org. Chem.*, **2024** e202400634 ; c) Lancel, Lindgren, Monnereau, Amara, *Photochem. Photobiol. Sci.* **2023**, 23, 79-92 ; d) Lancel, Golisano, Monnereau, Gomez, Port, Amara, *ACS Sustain. Chem. Eng.* **2023**, 11, 15674–15684 ; e) Lancel, Zimmerlin, Gomez, Port, Khrouz, Monnereau, Amara *J. Org. Chem.* **2023**, 88, 10, 6498–6508; f) Terra, Desgranges, Amara, Moores, *Catalysis Today*, **2023**, 407, 52-58 ; g) Lancel, Gomez, Port, Amara, *Front. Chem. Eng.*, **2021**, 3, 752364. ; h) Gellé, Price, Voisard, Brodusch, Gauvin, Amara, Moores, *ACS Appl. Mater. Interfaces*, **2021**, 13, 35606-35616 ; i) Blanchard, Asbai, Cottet, Boissonnat, Port, Amara, *Org. Process Res. Dev.*, **2020**, 24, 822-826 ; j) Tambosco, Segura, Seyrig, Cabrera, Port, Ferroud, Amara, *ACS Catal.* **2018**, 8, 4383-4389