

## Mechanistic investigation of uncommon photocatalytic processes

### Champagne, anyone?

Dario M. Bassani  
dario.bassani@u-bordeaux.fr



Photocatalysis has progressed tremendously over the last decade or so thanks to numerous applications in organic synthesis, where the high energy of excited states is used to induce reactions involving high-energy intermediates that would be otherwise inaccessible using conventional non-photoinduced means. Many times, however, the mechanistic details are only summarily explored, possibly leading to some confusion. Our work centers around investigating the mechanisms of unusual photocatalytic processes such as the upcycling of polystyrene or preventing the photocatalyzed degradation of white wines and Champagnes. In both of these cases, we confirm that the proposed mechanisms do not adequately explain the experimental observation and show that more detailed mechanistic investigations allow significant improvements. More recent work has focused on the photoinduced reduction of nitrogen into ammonia, one of the most polluting processes on the planet. Thanks to a novel process involving the use of solvated electrons, overall efficiencies greater than 10% are attainable.

#### References

- [1] A.-L. De Abreu, D. Taton and D. M. Bassani. *Angew. Chem. Int. Ed.*, **2024**, e202418680.
- [2] A. Furet, A. Sicello, B. Guillemat, C. Absalon, E. Langeron, D. M. Bassani, *Food Chem.* **2022**, 372, 131281; A. Furet, J. Findlay, D. M. Bassani, French patent application FR2113725.