



HAL
open science

New Trends in Photochemical Engineering and Technologies

Michael Oelgemöller, Karine Loubière

► **To cite this version:**

Michael Oelgemöller, Karine Loubière. New Trends in Photochemical Engineering and Technologies. EPA Newsletter, 2015, 10.1002/ceat.201590073 . hal-03764176

HAL Id: hal-03764176

<https://hal.science/hal-03764176>

Submitted on 30 Aug 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

New Trends in Photochemical Engineering and Technologies

Michael Oelgemöller^{1,*} and Karine Loubiere²

¹James Cook University, College of Science, Technology and Engineering, Townsville, Queensland 4811, Australia. Email: michael.oelgemoeller@jcu.edu.au

<https://research.jcu.edu.au/portfolio/michael.oelgemoeller/>

²Université de Toulouse, INPT, CNRS, Laboratoire de Génie Chimique (LGC UMR 5503), 4 allée Emile Monso, BP 84234, 31432 Toulouse, France.

In recognition of the 'International Year of Light and Light-based Technologies (IYL 2015)¹' the journal *Chemical Engineering & Technology (CET)* published a dedicated special issue on 'New Trends in Photochemical Engineering and Technologies' in January 2016.² The cover features the IYL logo together with a spiral-shaped capillary microreactor developed by Loubiere and co-workers (Figure 1). The device allowed for *in-line* reaction monitoring by UV-Vis spectrophotometry and was used to study a photochromic reaction.

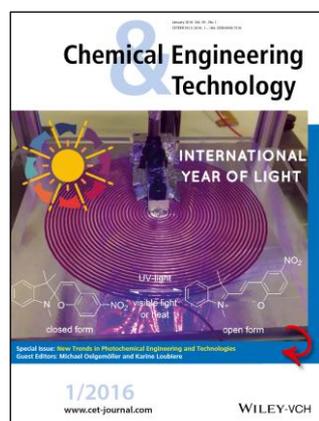


Figure 1. Front cover of the special issue of CET.

Associate-Professor Michael Oelgemöller from James Cook University and Dr Karine Loubiere from the Université de Toulouse served as guest-editors. The special issue comprises 5 review papers

and 13 research articles from across the world. The 18 contributions highlight new photoreactor systems and light sources, photoreactor modelling, photochemical methodologies and photoactive materials.

Strehmel et al. review digital imaging of lithographic materials by radical photopolymerization and photonic baking with NIR diode lasers. Lacombe and co-workers review reactors and materials used in gas-phase photooxidations for air treatment. Lomaev and colleagues present a review on excilamps and their applications in photochemistry. De Lasa describes photocatalytic efficiency evaluations using quantum yields and the photochemical thermodynamic efficiency factor. Rehm reviews photochemical fluorination reactions under continuous flow conditions. Oelgemöller et al. study photodecarboxylation reactions in an advanced continuous flow-reactor and furthermore apply it to the synthesis of a biological active target compound via a photo-thermal tandem process. Liu and collaborators develop a planar photocatalytic microreactor and assess its efficiency to degrade methylene blue. Li and co-workers utilize a microwave discharge electrodeless lamp in combination with H₂O₂ for the photooxidation of guaiacol to potentially valuable carboxylic acids. The group of Horikoshi develops solar-powered microwave discharge electrodeless lamps and utilizes them for continuous on-site field treatment of contaminated water. Deng uses computational fluid dynamics to assess radiation fields and disinfection efficiencies in UV reactors. Modelling and experiments in a spiral-shaped LED-driven microreactor are performed by Loubiere et al. to acquire kinetic data on a photochemical system. Ziegenbalg and his group study photon fluxes inside micro-structured photoreactors to demonstrate further optimization needs for these devices. Ponce-de-Leon and co-workers describe the construction of a photocatalytic flow reactor for the oxidation of methyl orange. Taghipour and Adeli report on the development of a GaN:ZnO-reduced graphene oxide composite for water splitting. Likewise, Fazaeli and colleagues design CdS and Ag/CdS nanoparticles for photocatalytic azo dye degradation. Hermosilla and collaborators describe the effects of carbonates on TiO₂-photocatalysis and photo-Fenton processes. Likewise, a commercially available TiO₂ photocatalyst doped with carbon is used by Ballari et al. for the degradation of acetaldehyde as an air pollutant.

Finally, Landgraf utilizes semiconductor light sources for time-resolved fluorescence HPLC detection.

Overall, the content of this special issue clearly demonstrates the importance of 'light' in applied photochemistry and photochemical engineering.

Acknowledgment – The authors thank Dr Elmar Zimmermann (deputy editor) and Dr Barbara Böck (editor in chief) of Chemical Engineering & Technologies for supporting this special issue.

References.

1. IYL 2015 homepage: <http://www.light2015.org/Home.html> (last accessed 29. December 2015)
2. M. Oelgemöller, C. Loubiere “New Trends in Photochemical Engineering and Technologies” *Chem. Eng. Technol.* **2016**, 39: 12.