講　演　会

From the Solar Production of Chemicals to Microflow Photochemical Synthesis

JAMES COOK UNIVERSITY AUSTRALIA

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日時　３月６日（木）１３：３０より

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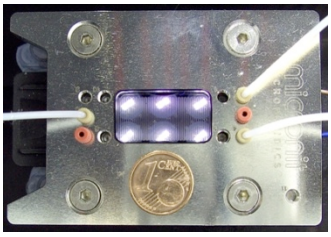
Abstract:

In 1912 Giacomo Ciamician, a pioneer in synthetic photochemistry, presented his spectacular vision of the 'Photochemistry of the Future' [1]. 100 years have pasted and organic photochemistry is still widely neglected by the chemical industry. At the same time, organic photochemistry can serve as a valuable green methodology since light is regarded as a clean and traceless reagent.

To overcome the high energy demand of most artificial light sources, natural sunlight has been used as a 'free' light source for the production of chemicals. Over the last decade, we have realized a number of laboratory- to large-scale solarchemical reactions in direct and concentrated sunlight. All reactions gave complete conversions and excellent yields after short illumination times [2].

Recently, microflow chemistry has emerged as a new synthesis tool. The combination of microspace and flow mode is especially advantageous for photochemical transformations [3]. The thin reaction channels guarantee extensive transmission of light throughout the reaction mixture even at high chromophore concentrations. In addition, the continuous flow mode allows for an accurate control of the irradiation time and furthermore minimizes secondary photoreactions. Over the last years we have studied a series of *homogeneous* and *heterogeneous* photoreactions to evaluate the potential of microflow photochemistry. In all cases examined, the reactions performed under microflow conditions gave higher conversions or yields thus proving the superiority of the microphotochemistry concept. We have also designed and tested new microreactor setups, among them a novel 10-microcapillary twin-tower for parallel microflow photochemistry [4].






This presentation will give an overview of our activities in ‘Green Photochemistry’ in macro- and micro-formats.

References:

[1] G. Ciamician, *Science* **1912**, *36*, 385. [2] M. Oelgemöller, C. Jung, J. Mattay, *Pure Appl. Chem.* **2007**, *79*, 1939. [3] M. Oelgemöller, *Chem. Eng. Technol.* **2012**, *35*, 1144. [4] A. Yavorskyy, O. Shvydkiv, N. Hoffmann, K. Nolan, M. Oelgemöller, *Org. Lett.* **2012**, *14*, 4342.