



photo LAB Sideloop Photoreactor

The limitation of discontinuous reactors (batch reactors) lies in their lack of precise reaction control and imprecise temperature management. Also, the photons' penetration depth can frequently be limited due to absorption, whereby no optimum photochemical reaction can take place.

In principle, photochemical reactions can be developed in the batch, semi-batch or conti-flow procedure. Each of the operating modes has advantages and disadvantages which must be taken into consideration based on the sought-after reaction. Batch reactors can only be safely scaled to industrial sizes with increased time and effort, while semi-batch reactors greatly simplify this procedure since the kinetics in the photoreactor can be analysed, understood and taken into consideration.

To this end, Peschl Ultraviolet GmbH has developed an optimised side-loop photoreactor, which can be used in the classic way as a semi-batch photoreactor and in conti-flow mode. In

some cases, it is appropriate to cascade these side-loop photoreactors so as to achieve an ideal space-time yield with maximum energy utilisation and controllable process conditions.

The optimised side-loop photoreactor is operated in a vertical set-up and takes up very little floor space. This means it can be operated in the safety cabinet. Depending on its design, the side-loop photoreactor can be gassed. Ventilation is not necessary due to the advantageous design. Also, there is no need to use siphon lines at the flow line or return line to avoid emptying, because no deposits are created on the boundary surface as a result of insufficient ventilation. The reaction is evenly circulated and has a constant dwell time in the irradiation zone. The upstream flow in the base makes it possible to run very low flow velocities to both determine and analyse the limits to over-irradiation. Tangential introduction allows for a high level of turbulence to be generated in the next step. The use of the **MPDS** cladding tube system means that the optical path and

the usable volume can be adjusted by means of different combinations. When implemented in conjunction with a large HR insert, the side-loop photoreactor can be used as a thin-layer system with a high level of turbulence. External cooling, which is available as an option, enables the reactor's temperature to be controlled. As with every MPDS photoreactor, the standardised measuring point is included for further analysis.

The side-loop photoreactor from Peshl Ultraviolet GmbH enables users to perform photochemical reactions in the side-loop procedure and was developed for routine operation – both for preparative and for kinetic and thermochemical examinations in the laboratory.

The use of an extremely wide range of lamps (mercury-vapour, low-pressure immersion lamps; mercury-vapour, medium-pressure immersion lamps and Xenon immersion lamps) translates into a wide range of spectral frequencies which can be selected

for the reaction.

The following aspects of this photoreactor are beneficial:

- Controlled thermal conditions
- Controlled flow rate
- Controlled conversion rate and analysis of the reaction kinetics
- Long dwell time
- High level of material exchange
- Transmission up to the UVC range
- Chemically inert and stable
- Different optical paths can be set
- Thin-layer operation possible

