

## 2D fluorescence probe for inline water and wastewater monitoring

In wastewater treatment plants, 24-hour composite samples are currently used to monitor water treatment processes. Here, a sampler continuously collects wastewater for one day, which is then analyzed in the laboratory. Important wastewater parameters such as TOC (Total Organic Carbon) or BOD (Biological Oxygen Demand) can be determined from the samples with wet-chemical methods. These parameters represent the organic pollution load and are important for monitoring and controlling wastewater treatment plant processes. They cannot, however, be measured with optical inline methods reliably and at high temporal resolution. To improve the processes in the sewage treatment plant, it is necessary to measure these sum parameters continuously and in real time. Achieving this would ensure that the wastewater can be treated at a consistently high quality, even if the composition of the inflow fluctuates greatly. Certain treatment steps, such as ozonation of the wastewater, could thus be controlled in a targeted and data-based manner.

### Inline monitoring instead of 24-hour composite samples

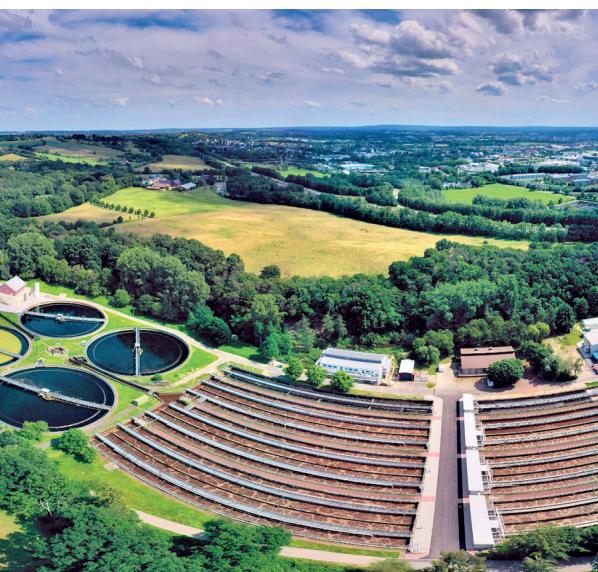
With a new type of spectroscopic measuring probe, engineers at Fraunhofer ILT shall determine important sum parameters such as the TOC or BOD value in real time for monitoring in

wastewater treatment plants in future. The method they are using is 2D fluorescence spectroscopy, which has proven itself in the laboratory for characterizing wastewater, but is not available as a process capable of inline monitoring. This spectroscopic method is based on recording fluorescence spectra at different excitation wavelengths, a method that generates a two-dimensional excitation emission matrix. In conjunction with multivariate analysis methods, the fluorescence spectra can be used to obtain information for monitoring the wastewater treatment processes.

### Inline 2D fluorescence probe

The first version of an immersion probe capable of inline monitoring was built at Fraunhofer ILT and will be qualified and optimized for use in wastewater treatment plants along with partners from industry and research as part of the AIX-Watch research project. The partners are developing an application-specific evaluation process based on multivariate data analysis for this purpose. The project is funded by the Federal Ministry of Education and Research under the grant number 03RU2U014F.

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*1 Aachen-Soers wastewater treatment plant of the Eifel-Rur Water Board (WVER).  
2 Immersion probe for 2D fluorescence spectroscopy.*