PRESS RELEASE

The Fraunhofer IST at the IFAT 2022

Energy-efficient, resource-saving and environmentally friendly: Pollutant reduction without the addition of chemicals

Whether in the production of food and medicines, in horticultural businesses, in hospitals, or in every private household – disinfection and the reduction of pollutants in water and on surfaces play an important role in many areas of application. The addition of chemicals should, however, be avoided as extensively as possible in all these applications. This can be made possible through, for example, treatment with electrochemically produced ozonated water, a process which the Fraunhofer IST has been researching and developing for many years now.

Strong oxidants such as ozone or hydrogen peroxide are capable not only of significantly reducing or completely removing widely differing pollutants; they are also suitable, in the appropriate concentration, for killing germs, undesirable algae or fungi. At the Fraunhofer IST, electrochemical processes are being developed with which such strong oxidizing agents can be generated directly from water. For the electrode material, diamond is utilized. Diamond electrodes are characterized by high electrochemical stability, i. e. particularly high voltages can be applied to the electrodes without the water thereby degrading into hydrogen and oxygen. As a result, ozonated water can be produced quickly and, above all, in an energy-efficient manner that conserves resources and protects the environment. The addition of chemicals is therefore no longer necessary in order to reduce pollutants.

A further special feature is that the electrochemical cells can be optimally adapted to individual conditions with regard to location and type of deployment. For this purpose, specific electrode geometries are developed on an application-specific basis at the Fraunhofer IST and are coated with various diamond modifications by means of highly productive coating technology. The disinfection system is suitable both for aqueous media – for which cleaning takes place during throughflow – and for surfaces which are treated with the aid of a spray mist.

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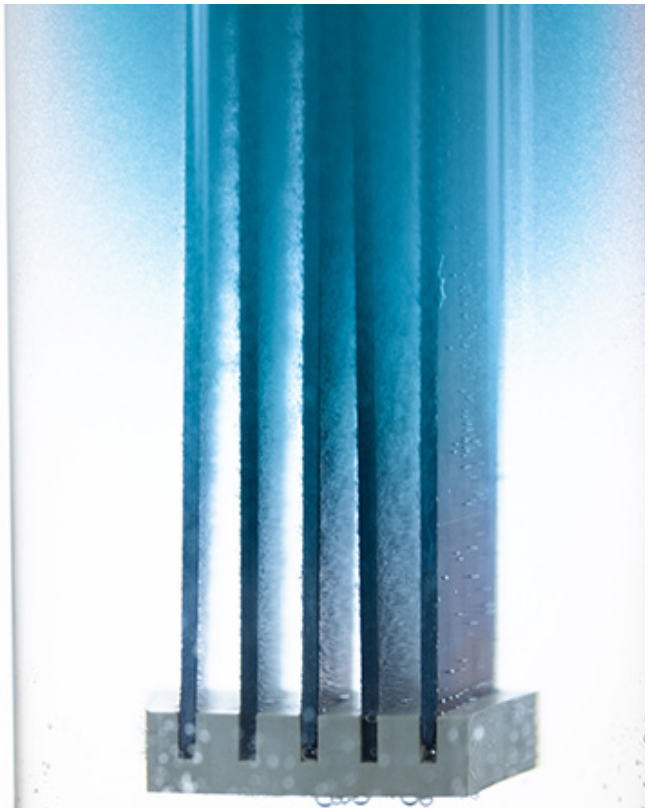
At IFAT 2022, as part of a joint stand with the Fraunhofer SysWater Alliance, the Fraunhofer IST will be presenting the diamond-electrode-based "DiaDis" system for the production of ozonated water (Hall B2.215, Stand 314). The system is mobile and can be operated directly on site where pollutants need to be reduced without the use of additional chemicals, e. g. in drinking-water and wastewater pipes during the reduction of micro-pollutants or germs, or in ultrapure water, cooling and humidification systems or food processing plants in order to prevent biofilms. At the trade show, visitors will be provided with the opportunity of experiencing the "DiaDis" system in operation during the production of ozonated water.



Water purification by means of diamond electrodes: Demonstration of the degradation of blue textile dye using diamond electrodes. © Fraunhofer IST

Mobile ozone generator based on diamond electrodes for on-site production of ozonated water. © Fraunhofer IST

The **Fraunhofer Institute for Surface Engineering and Thin Films IST** is an innovative partner for research and development in surface technology, with expertise in the associated product and production systems. The aim is to develop customized and sustainable solutions: from prototypes, through economic production scenarios, to upscaling to industrial magnitudes – and all this whilst maintaining closed material and substance cycles. The Fraunhofer IST is one of the seventy-five institutes of the Fraunhofer Society, Europe's leading research organization.