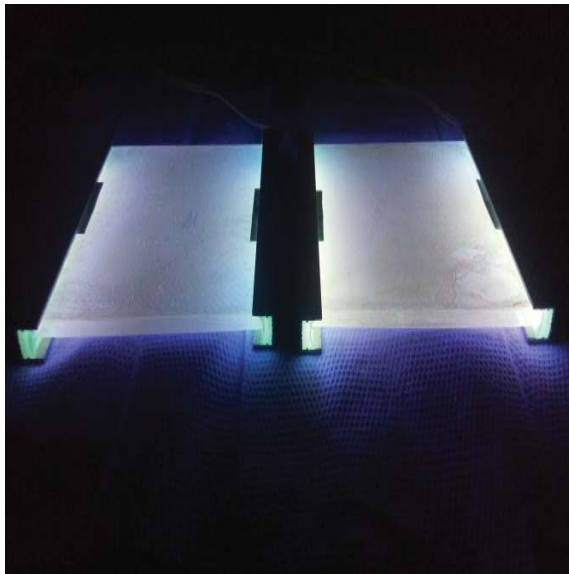


Turbidity-independent photocatalytic reactors using active light induction

Photocatalytic water and wastewater treatment is a promising technology for the oxidation and removal of persistent organic pollutants, which simply works with light and reusable catalysts. Suitable photocatalysts are mostly semiconductors or transition metal oxides, where the energetic resistance of the band gap can be overcome by UV radiation. This can lead to an electron transfer causing electron-hole pairs, which initiate redox reactions at the surface. The hereby generated hydrogen and hydroxyl radicals are able to oxidize or reduce pollutants in water. One of the most limiting factors of this technology is the loss of light through the water body during irradiation as well as the loss of suspended catalyst (nano-)particles.

Aim of this network project is to design and develop an innovative reactor concept, with photocatalysts being immobilized on light-transmissive carrier materials. The photocatalysts can absorb the light, which is directly coupled into the pre-treated carrier materials by laterally attached LED modules and does not have to pass the water body. Accordingly, the photocatalytic coating requires a very high stability and sufficient translucence. This concept allows realizing very compact reactors with a relatively large ratio of immobilized photocatalytic surface to reactor volume.

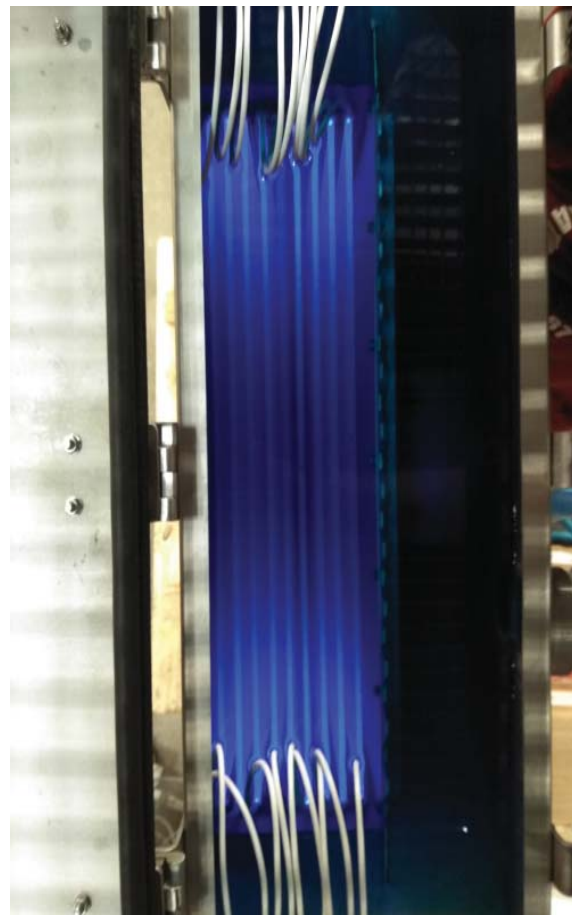


Turbidity-independent photocatalytic reactors

Light incoupling into photocatalytically coated glass panels using UVA LEDs

Photo: Nikolai Otto

Financing Institution:
AiF Projekt GmbH, Central Innovation Programme for SME, funded by the Federal Ministry for Economic Affairs and Energy (BMWi)
Contact:
Dipl.-Ing. Nikolai Otto Dr.-Ing. Uwe Menzel
Project partner:
Institute for Manufacturing Technologies of Ceramic Components and Composites (IFKB), University of Stuttgart, Leiblein GmbH, Lightpanel GmbH
Projektlaufzeit
10/2016 – 09/2018



Generation of large illuminated photocatalytic surfaces through stacking of coated panels in a semi-industrial pilot reactor

Photo: Nikolai Otto