

Nano-Coated Fiber Optics: New Reactor Technologies for Water Treatment



The presence of water-borne pollutants and their possible effects on living organisms has emerged as a serious environmental concern. There is an increasing need for cost- and energy-efficient clean technologies such as advanced oxidation processes for the removal and degradation of pollutants before they find their way into ground water wells, surface waters and drinking water. This new collaboration between ASU and DCU will advance the creation of an innovative and cost-effective new technology that will lead to innovation in water treatment processes.

ASU has been working on a small-systems drinking water treatment project funded by the U.S. Environmental Protection Agency towards innovative photocatalysis reactors (UV/TiO₂ advanced oxidation process). A large opportunity exists for enhancing the efficiency of the catalyst. The Water Institute at DCU has also developed a series of new modified TiO₂ catalysts that function in both the UV and visible regions of the solar spectrum. The shortcoming of all of these new catalysts is that they have to be

applied as a slurry, which is neither practical nor viable in drinking water treatment.

ASU is developing a UV-LED/fibre optic reactor to utilise fibre optics both for UV light delivery and as a substrate for a fixed-film catalyst (the catalyst is bound to the fibre optic). It is now envisaged that such a fibre optic reactor could be easily deployed into existing drinking water treatment facilities. The team will integrate visible light photocatalysts from DCU onto fibre optics from ASU, and characterise their performance to oxidise pollutants in water.

Significantly contributing to this collaborative project is the PhD work of Ms. Heather Stancl, on Prof. Westerhoff's team at ASU and also the input from Dr. Anne Morrissey and her team who are part of the DCU Water Institute.



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