Best Analytical Chemistry Poster at Environ 2020

Winner Stuart McMichael, University of Ulster

Electrochemically Assisted Photocatalysis for Water Treatment

Water treatment technologies is an important area of research due to the +2 billion people without access to a safe source of drinking water, industrial water remediation and the increasing pollution of our drinking water. This is where photocatalysis can be used to help treat water, by using a semiconducting material to speed-up a photoreaction by electron excitation. In this work, a semiconducting material on a conductive substrate was used to create a photoanode and an external bias applied. The applied bias increases the performance by reducing recombination of the excited electron improving the generation of radicals which can oxidise the contaminate. To further improve the photoanode nanoengineering was using to produce nanotubes on the surface. As the process requires a counter electrode, a gas diffusion electrode with platinum nanoparticles was examined for oxygen reduction, as a low-cost method using a precious metal. In terms of hydrogen peroxide production, the non-modified electrode had the highest faradic efficiency, even though the platinum nanoparticles had lower onsite potential and high current density. The next steps are to evaluate the combination of the nanotube photoelectrode and the gas diffusion electrode the inactivation of *E. coli*.