

Treating the water with light and sound

The modern lifestyle has resulted in the occurrences of a huge number of toxic compounds in various environmental matrices, including water. These include pharmaceutical and personal care products (PPCPs), pesticides, dyes, volatile organic compounds (VOCs) and many more. One common issue with the treatment of these compounds (called as emerging contaminants) is that the conventional treatment technologies are inefficient in their removal from water and wastewater.

In recent years, the advanced oxidation processes (AOPs) have shown promising results for removing many different groups of these contaminants. Out of the available AOPs, photocatalysis is one of the most promising technology since it can be directly carried with light, and without the requirement of additional reactants. Further, a synergistic effect with ultrasound has been observed to significantly increase the treatment efficiency of these compounds.

However, at present, the application of photocatalysis is primarily with the UV light since the current semiconductor materials based photocatalysts are inefficient with visible light. The focus of our group is to develop photocatalysts having sufficient photo activity with visible light, and to apply these in sonophotocatalytic process to achieve comprehensive mineralisation of these pollutants. We are investigating the role of semiconductor materials based catalysts, as well as organometallic compounds to achieve this treatment with visible light, particularly the sunlight, and their synergy with ultrasonic irradiations.

