

Environmental Pollutants Degradation and Air Disinfection Using VUV Based Photocatalytic Technology

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Abstract

Photocatalytic oxidation (PCO) is one of the fastest developed technologies for the control of environmental pollutants (in both gaseous and aqueous state) as well as for energy production such as hydrogen generation through water splitting. The PCO process is normally triggered by the irradiation of UV light on photocatalysts. The most widely used UV sources in PCO are 254 nm and 365 nm UV lamp. However, conventional PCO process has disadvantages such as recombination of electron-hole pair in photocatalyst leading to low process efficiency and photocatalyst deactivation. In order to improve the efficiency and stability of the PCO process, VUV lamps with 185 nm UV irradiation can be used to activate photocatalysts and generate active oxidants such as O and OH radicles, as well as ozone all of which enhance the oxidation of the organic fraction of the pollutants. These can also kill microbes and common environmental pathogens in the air and water, and therefore have excellent disinfection effect. In this talk, the results of VUV enhanced photocatalytic degradation of common VOCs (such as toluene and benzene) and water pollutants (such as methyl blue and acrylic wastewater) together with its disinfection effect on common pathogens including bacteria and viruses will be presented and discussed.