

UV disinfection of the Sewage treatment plant effluent with the specially designed thin film flow Photocatalytic reactor

김성진¹, 김태한¹, 김둘선^{1,2}, 이동근^{1,2,*}

¹경상대학교 생명화학공학과;

²BK21 핵심환경기술전문인력양성사업팀

(d-kee@gsnu.ac.kr*)

TiO₂ in anatase crystal form is a semiconductor with a bandgap energy of 3.2eV or more. Upon excitation by light of wavelength less than 385 nm, the photon energy generates an electron-hole pair on the TiO₂ surface. This electron-hole pair produces highly reactive oxygen species. These highly reactive species oxidize organic compounds adsorbed on the catalyst surface. The application of photocatalysts to destroy organic pollutants from contaminated water has been extensively studied. Microbial cells in water were reported to be killed by the action of TiO₂ photocatalysis. This finding gave us an insight that the efficiencies of UV disinfection might greatly be enhanced when both the photolytic and photocatalytic function are combined together. In the present study a thin film flow photocatalytic reactor was designed and used for the disinfection of the sewage treatment plant effluent. At the bottom of the reactor 0.3 μ m TiO₂ was coated and the water was flowed downward through the surface of the reactor.

Perfect disinfection of Coliform could successfully be performed stably upto 2year continuous operation.