

Ag nanoparticles-decorated on hierarchical anatase/rutile TiO₂ nanowires with enhanced antimicrobial property

이원석, 박주희, 조윤경*
울산과학기술대학교
(ykcho@unist.ac.kr*)

Recently, there are growing interests in using titanium dioxide (TiO₂) as an antibacterial agent due to its strong photo-oxidation activity. In this paper, we developed new nanostructures of Ag nanoparticles-decorated hierarchically TiO₂ nanostructures for enhanced antimicrobial activity by increased surface area, decreased recombination rate, and the inherent effect of Ag as an antimicrobial activity. The structures were successfully fabricated by using electrospinning for TiO₂ nanofibers, hydrothermal process for the synthesis of TiO₂ nanowires on the electrospun TiO₂ nanofibers, and photo-reduction process for the deposition of Ag nanoparticles on the synthesized TiO₂ nanowires. In this structure, the electrospun TiO₂ nanofibers have rutile phase and the TiO₂ nanowires synthesized on electrospun TiO₂ nanofibers have anatase phase. This combination of distinct phase improved the photocatalytic performance by increasing the recombination time. We believe that this Ag nanoparticles-decorated hierarchically TiO₂ nanostructures will be useful for water purification system with high efficiency, reusability, and reliability.