



Bactericidal Mechanisms of Ag₂O/TNBs under both Dark and Light Conditions

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Ag₂O deposited titanium dioxides nanobelts (Ag₂O/TNBs) were fabricated and used to investigate the toxic effects on aquatic microorganisms. The disinfection activities of Ag₂O/TNBs on two representative bacterial strains: Gram-negative *E. coli* and Gram-positive *B. subtilis*, were examined under both dark and light conditions. Ag₂O/TNBs exhibited stronger bactericidal activities than TNBs under both dark and light conditions. For both cell types, disinfection effects of Ag₂O/TNBs were greater under light conditions relative to those under dark conditions. The bactericidal mechanisms of Ag₂O/TNBs under both dark and light conditions were explored. Under dark conditions, neither Ag⁺ ions released from Ag₂O/TNBs nor TNBs contributed to the bactericidal activities of Ag₂O/TNBs. Under light conditions, both the released Ag⁺ ions and TNBs yet were found to have contributions to the bactericidal effects of Ag₂O/TNBs. Active species (H₂O₂, ·O₂⁻, and e⁻) generated by Ag₂O/TNBs played important roles in the disinfection processes under both dark and light conditions. Without the presence of active species, the direct contact of Ag₂O/TNBs with bacterial cells had no bactericidal effect.