

Development of Antibacterial Surface Based on Bio-Inspired Hierarchical Surface

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Abstract : The development of antibacterial surface has devoted extensive researches and important field due to the growing antimicrobial resistance strains. The superhydrophobic surface has raised attention because of reducing bacteria adhesion in the absence of antibiotic agents. Evaluating the current development antibacterial surface has to be investigating to consider the potential of applying superhydrophobic surface to reduce bacterial adhesion or role of patterned surfaces on it. In this study, we present different samples with bio-inspired hierarchical and microstructures to consider their ability in reducing bacterial adhesion. The structures have inspired from rice-like pattern and lotus-leaf that developed on the polydimethylsiloxane (PDMS) and polypropylene (PP). The results of the attachment behaviors have considered on two bacteria strains of gram-negative Escherichia coli (E. coli) bacteria and gram-positive Staphylococcus aureus (S. aureus). The reduction of bacteria adhesion on these roughness surfaces demonstrated the effectiveness of rinsing ability on removing bacterial cells on structured plastic surfaces. Results have also offered the important role of bacterial species, material chemistry and hierarchical structure to prevent bacterial adhesion.

Keywords : hierarchical structure, self-cleaning, lotus-effect, bactericidal

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