Fluorinated Diamond-like Carbon Coating on Polylactic Acid Film Prepared by Plasma-enhanced Chemical Vapor Deposition

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Biodegradable film like Poly(lactic acid), PLA has nowadays come to biomedical and food applications with the key role of antibacterial property. This study introduced F-DLC coatings on PLA film by 13.56 MHz PECVD. Acetylene (C₂H₂) and carbon tetrafluoride (CF₄) gas mixture was utilized for film formation. A 32 µm PLA film was pre-activated by argon plasma to perform C-C firs layer and/or C-F bondings. The deposition rate was found to decrease with increasing CF₄ due to reactive fluorine ion over carbon. F-DLC thickness measured by an ellipsometer revealed coating thickness of 150-500 nm and roughness of 10-15 ±2 nm with CF₄ concentration reduced from 50 to 10 vol.%. The surface energy was found to reduce with increasing fluorine content. By the colony-counting method, it was found that enriched fluorine film reduced E. coli colonies down to 9 %. Others measuring results and discussions will be performed and reported.

Keywords
Biodegradable film
PLA
f-DLC
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