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鯊魚皮表面盾鱗結構於抗沾黏與抗腐蝕能力之研究

正式報告

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中文摘要

在海洋環境中，有機物的沉降導致生物膜形成，慢慢地藤壺、貽貝、管蟲、藻類黏附在船身，造成航海時阻力增加、船身金屬的腐蝕。為了降低生物沾黏及金屬腐蝕，大部分的船隻會塗佈船底防污漆，由於塗漆內含有生物殺菌劑，藉由釋放作用可以防止生物汙垢，但同時也造成海洋環境危害。有鑑於此，本研究計畫結合鯊魚皮膚上微觀結構的抗沾黏特性，及高分子材料的疏水特性，提出一種高分子材料仿生鯊魚皮結構的表面，以取代船底防污漆。所製備之樣本先以水接觸角（Water Contact Angle）、電子顯微鏡（Scanning Electron Microscope，SEM）及雷射掃描共軛焦顯微鏡（Laser Scanning Confocal Microscopy）確認表面親疏水性及表面結構。進一步地，我們在實驗室內進行樣本表面之抗生物膜生成試驗及腐蝕測試，接著，將所製備之仿生樣品置於旗津海岸，在實際的海水中測試生物膜的形成及腐蝕現象。

關鍵字：船舶塗料、仿生工程、抗生物沾黏、抗腐蝕

Abstract

In the marine environment, the organic matter leads to the formation of biofilms and the attachment of mussels and algae. The biofilm increased resistance and corrosion during navigation. In order to reduce bio-fouling and metal corrosion, most vessels are usually coated with the anti-fouling paints on the bottom of the ship. Because the paints contain biocides, which can kill microorganism by releasing process. However, biocides are usually toxic which cause marine environmental hazard. In view of this, the proposal combines the biomimetic shark skin with the microstructures, which provide an anti-fouling property and polymer materials, which provide a hydrophobic property to develop a surface of anti-biofouling and anti-corrosion to replace the traditional paints. The prepared biomimetic shark skin surfaces are first characterized by water contact angle, scanning electron microscope (SEM), and laser scanning confocal microscopy (LSCM) to confirm their surface wettability and structure. Further, the biomimetic shark skin surfaces are carried out in the laboratory and the Qijin coast to evaluate the ability of anti-biofilm formation and anti-corrosion.

Key words: marine coating, biomimetic engineering, anti-biofouling, anti-corrosion