Development and field testing of smart antimicrobial coating

By

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Abstract

The control of microbial infections is an important issue. Many of the international organizations, including the Centre of Disease Control (US), the US Environmental Protection Agency (USEPA) etc, have been promoting protocol for cleaning in households, public area and hospitals for years. Many new technologies have been developed to tackle the long survivability of microorganisms and their ability to be transferred by indirect contact through inanimate surfaces. This can be achieved by either physically or chemically disinfect an area. However, most of the methods do not provide a sustainable protection to inanimate surfaces. Antimicrobial surfaces are considered as a possible solution. Antimicrobial surfaces are usually designed by impregnation of biocides in the material such that the biocides can be released slowly to the surrounding. However, the time required to kill the microorganism is usually long. In this work, a chlorine dioxide based antimicrobial coating has been fabricated using nano-encapsulation technology. The antimicrobial coating demonstrate antimicrobial activity by contact killing and release-killing property. The antimicrobial coating has been tested in isolation ward, orthopedics and elderly home. All the field study results concluded that the antimicrobial coating was able to improve the cleanliness of the coated surfaces compared to routine cleaning regime with diluted bleach solution. Most importantly, the occurrence of Multidrug resistant bacteria on surfaces has been significantly reduced. An alternative antimicrobial coating has been developed using natural plant extract. Synergism in antimicrobial activity has been observed through the combination of different phytochemicals and membrane-active polymer. The phytochemical based coating has shown irreversible damage to the membrane of both gram positive bacteria and gram negative bacteria.

Date: 18 September 2015 (Friday)
Time: 10:30 **
Venue: Room 4577 (Lift 27-28)

Examination Committee:
Prof. Ning Li, Chairman
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Prof. Fei Sun, Prof. Wei Han, CBME
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- ALL ARE WELCOME -