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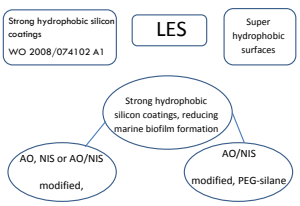
Low adhesive surfaces to non-toxic control of marine biofouling

The current non-toxic marine biofouling control is based on the idea for creation of non-adhesive, low-fouling material surfaces. Strong/super hydrophobic low-energy surfaces (LES) are preferable in the marine biofouling control because of their stability in water media. Siloxane fouling release coatings still are the only viable non-toxic commercial alternative to the toxic biocide antifouling paints although antioxidant coatings and super hydrophobic surfaces are discussed lately as other ones. However, the siloxane fouling release coatings only partially inhibit biofouling since biofilms remain a major issue. With aim to reduce bacterial adhesion and multispecies biofilm formation, non-ionic surfactants (NISs), non-toxic antioxidants (NAOs) or their combinations, NIS/NAO and PEG-silane co-cross-linker were tested as modifying agents in such nanocomposite coatings together with a creation of super hydrophobic surfaces. The antimicrobial activity was correlated to surface physical-chemical and physical-mechanical parameters relevant to bio-adhesion. Antifouling siloxane nano composite coatings were developed with excellent anti-biofouling properties: totally preventing marine macro fouling even on static immersed surfaces as ell as sharply reduced multispecies biofilm formation, the scare biofilm being easily removed by gentle wiping or cleaning with running water. All experimental results indicate that the prevention of the complex marine biofouling process requires complex approach.



Biography

Vladkova has her expertise in surface engineering starting as a member of a pioneering group in the development of brush type PEG coatings (Coll&Surf, 1986) to create bioinert biomaterial surfaces, that do not cause non-desirable response reactions. Later she moves to bioactive biomaterials and material surfaces: bio-integrating biomimetic nanocomposites for bone tissue engineering; antimicrobial collagen based nanocomposites; marine biofouling preventing composition coatings; magnetron sputtered antibacterial coatings for medical devices, etc. Inhibition of bioadhesion and biofilm formation as well as surface characteristics, influencing biofouling (medical and marine) are in the focus of her investigations with a special emphasis on the non-toxic biofouling control including super hydrophobic surfaces utilization..

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