

Prevention of biofouling by bio-inspired photocatalytic nanocoatings*Sergey Dobretsov**Department of Marine Science and Fisheries, College of Agricultural & Marine Sciences, Sultan Qaboos University, P.O. Box 34 Al Khoud 123, Sultanate of Oman**Center of Excellence in Marine Biotechnology, Sultan Qaboos University, P.O. Box 50 Al Khoud 123, Sultanate of Oman*

Biofouling is undesirable growth of organisms on submerged installation and it has heavy economic penalties. Current methods of antifouling defense (AF) are based on usage of toxic biocides that kill marine organisms and pollute the environment. The natural AF defense mechanism of some seaweeds that inhibits biofouling by production of reactive oxygen species (ROS) inspired us to mimic this process by fabricating ZnO nanorod photocatalytic coating. AF activity of fishing nets modified with ZnO nanocoating was compared with uncoated nets (control) and nets painted with commercial copper-based AF paint. One-month experiment in tropical waters showed that nanocoatings reduced bacterial abundances by 3-fold compared to the control and had higher antifouling performance over AF paint. Metagenomic analysis of prokaryotic and eukaryotic fouling organisms using MiSeq next generation sequencing platform proved that nanocoatings compared to AF paint were not selectively enriching communities with the resistant and pathogenic species. The proposed bio-inspired nanocoating is an important contribution towards environmentally friendly AF technologies.