

S6-P.5

Static vs Novel Dynamic Biofouling-Testing of Fouling-Release Coatings for Marine Applications: Pros and Cons

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With increasing numbers of seaborne transportation of goods worldwide, the exploitation of the ocean is rising. More and more ships and marine equipment with biocide-containing antifouling coatings are in contact with the ecosystem “ocean”. The development of environmentally friendly coatings preventing or allowing a management of biofouling is therefore an urgent issue. To achieve this aim, it is essential to have access to appropriate immersion testing methods to evaluate the fouling-release properties of novel coating systems under most realistic conditions. In this study, a novel dynamic biofouling-test stand was designed and constructed to simulate the movement of a ship and to provide a reproducible testing method for marine coatings. Mechanically durable and environmentally friendly polythiourethane (PTU) / tetrapodal zinc oxide (t-ZnO) microparticle composite as well as reference materials such as AlMg3 alloys and pure polydimethylsiloxane (PDMS) were immersed in the Baltic Sea under static and dynamic conditions for 22 weeks. Strong differences in the degree of biofouling subjected to those conditions were found.