

Research progress of marine antifouling coatings and their performance evaluation technologies

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Abstract: Marine antifouling coatings can effectively keep ship hulls free from the adhesion of marine organisms, thereby preventing increased ship sailing resistance, operating costs and carbon emissions^[1]. However, due to the long evaluation period and the increasingly strict environmental regulations, developing long-term antifouling coatings has become a challenging task.

In this paper, the research progress of the self-polishing coatings based on ion exchange, hydrolyzable or degradable polymers and the fouling release coatings based on silicone elastomers is reviewed^[2,3]. Additionally, this paper also presents the research progress of laboratory and real-sea performance evaluation techniques. To further shorten the evaluation period and develop long-acting antifouling coatings, we established a rapid laboratory optimization method for antifouling coatings. By using orthogonal experiment design, the influences of pigment volume concentration (PVC), resin/rosin mass ratio and the amount of additives (R) on the biocides release rate and adhesion of coatings were studied, and the optimal value of PVC, resin/rosin mass ratio and the amount of additives (R) were obtained^[4].

Based on the above methods, we have developed a series of novel degradable self-polishing coatings for different applications. Such coatings have been widely used because of their good antifouling performances and drag reducing properties.

Keywords: Degradation, antifouling coating, performance evaluation, application

Reference

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