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Short Communication

Antifouling Behavior of a Low-Pressure Cold-Sprayed Cu/Al_2O_3 Composite Coating

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In the present investigation, a Cu/Al_2O_3 composite antifouling coating was designed on Q235 steel to improve the service life of vessels, components and structures used in marine environments. The base Al_2O_3 coat was prepared by flame spraying and the antifouling Cu coat was prepared by cold spraying. The Al_2O_3 layer serves as an insulation layer to separate the copper coating from electrical connection to the steel substrate in case of galvanic corrosion, which also can guarantee the release rate of Cu(I) and Cu(II) ions under cathodic protection conditions. The physical and antifouling performance were examined and the following conclusions were drawn: An excellent Cu/Al_2O_3 antifouling coating can be deposited on the steel substrate. The typical bond strength is about 10MPa between Cu layer and Al_2O_3 layer and bond strength between the Al_2O_3 layer and the substrate was about 20MPa. The antifouling performance, compared to a blank sample (Al_2O_3 coated steel) indicates that the Cu/Al_2O_3 antifouling coating can inhibit 85% of biofouling by barnacles, diatoms and mussels.

Keywords: Oxyacetylene flame spraying, Low pressure cold spray, Antifouling, Corrosion

FULL TEXT