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Biocide encapsulated zeolite-epoxy nano hybrid coatings

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The present study aims on the fabrication of diglycidyl ethers of bisphenol-A (DGEBA) based epoxy coating containing low cost as well as less toxic antifoulants viz., benzoic acid (BA) and sodium benzoate (SB). These two antifoulants were introduced into epoxy resin through nano-zeolite containers separately in the amount of (1, 3, 5, 7 and 10 wt. %) to investigate their corrosion resistant behaviour and antifouling capabilities. Corrosion rate of 3 wt. % SB incorporated epoxy AF coating was determined to be much lower than that of 3 wt. % BA incorporated epoxy AF coating. A direct relationship between the corrosion rate, antifouling nature, antibacterial behaviour and toxicity was observed by electrochemical impedance spectroscopy, salt spray test, static immersion study, antibacterial test and acute toxicity tests. The SB encapsulated coating with 3 wt. % loading exhibits enhanced antifouling and corrosion resistance performance, while for AF coatings containing 5 wt. % loading of BA showed a marked reduction in fouling attachment than other coating compositions.

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