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Study of corrosion inhibitors effect on the corrosion behavior of nanopolymer crystalline W-42Cr-5Ni alloy in 0.5 M NaCl solution

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A corrosion inhibitor is a chemical substance, which when added in a small concentration to a corrosive environment, effectively decreases the corrosion rate of a metallic substance that exposed to the environment. The corrosion control method of metals and alloys using the inhibitors is a fundamental academic and industrial concern that has received a considerable attention nowadays. Effects of three eco-friendly green corrosion inhibitors of sodium salts of nitrite, molybdate and tungstate in different concentrations (i.e., 200-2400 ppm) on the corrosion behavior of the sputter-deposited ternary nanocrystalline W-42Cr-5Ni alloy were studied using corrosion tests and electrochemical measurements in 0.5 M NaCl solution open to air at 25 °C. The use of these corrosion inhibitors enhanced to increase the corrosion resistance properties of the alloys as a result the corrosion rate of the W-42Cr-5Ni alloy was decreased with increasing the concentrations of sodium nitrite from 200 to 2400 ppm. The inhibition action of the tested inhibitors was found to obey the Langmuir isotherm model and the inhibition efficiency was found to increase with increasing the inhibitors concentration.

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