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## Corrosion inhibition effects of tungstate and nitrite ions on sputter-deposited nanocrystalline W-42Cr-5Ni alloy in 0.5 M NaCl solution

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The effect of sodium salts of tungstate and nitrite, as the green corrosion inhibitors on the sputter-deposited nanocrystalline W-42Cr-5Ni alloy was investigated in 0.5 M NaCl solution open to air at  $25\pm 1^\circ\text{C}$  using corrosion test, inhibition efficiency and mechanism as well as open circuit corrosion potential measurements. The use of tungstate and nitrite ions enhanced the corrosion resistance properties of the nanocrystalline W-42Cr-5Ni alloy. The corrosion rate of the alloy was found to be significantly decreased with increasing the concentration of both the corrosion inhibitors used in the present study in 0.5 M NaCl solution, mostly due to the physical adsorption of tungstate and nitrite ions on the surface of the alloy. The corrosion inhibition mechanism of the tungstate and nitrite ions on the alloy surface was explained by Langmuir adsorption isotherm. Experimentally obtained values of the standard free energy of adsorption ( $\Delta G^\circ_{\text{ads}}$ ) of both the sodium tungstate and sodium nitrite for the alloy was found to be  $-26.31\text{ kJ/mol}$  and  $-23.38\text{ kJ/mol}$ , respectively. The corrosion inhibitors of sodium tungstate and sodium nitrite act as an anodic inhibitor for the sputter-deposited nanocrystalline W-42Cr-5Ni alloy in 0.5 M NaCl solution at  $25\pm 1^\circ\text{C}$ , due to the shifting of the open circuit corrosion potential of the alloy specimens towards the more positive direction with increasing concentration of the inhibitors.

### Biography

Durga Bhakta Pokharel has completed his MSc from Tribhuvan University, Nepal. He is a Lecturer of Chemistry at Kathmandu Institute of Technology. He has published three papers in reputed national and international journals.

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