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# 2,2′-Dithiobis(2,3-dihydro-1,3-benzothiazole) as an effective inhibitor for carbon steel protection in acid solutions

Mahmoud G.A. Saleh[a], S. Abd El Wanees[b,c,*]

[a]*Chemistry Department, Faculty of Science, Northern Border University, Arar, Saudi Arabia, email: mgsaleh72@yahoo.com (M.G.A. Saleh)*
[b]*Chemistry Department, Faculty of Science, Zagazig University, Zagazig, Egypt, email: s_wanees@yahoo.com (S. Abd El Wanees)*
[c]*University College of Umluj, Umluj, Tabuk University, Tabuk, Saudi Arabia, email: s_nasr@ut.edu.sa (S. Abd El Wanees)*

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**ABSTRACT**

2,2′-Dithiobis(2,3-dihydro-1,3-benzothiazole), DTDBT, was used to mitigate the destructive effect of 0.5 M HCl on the C-steel surface. Gravimetry, potentiodynamic polarization, and electrochemical impedance spectroscopy, techniques as well as scanning electron microscopy complemented with energy-dispersive X-ray analysis for some corroded steel samples were employed. The data of different techniques were compatible and confirmed the inhibition effect of DTDBT. The potentiodynamic polarization data disclosed that the DTDBT molecules behave as a mixed-kind inhibitor. The different thermodynamic factors for the corrosion and adsorption processes were deduced to suggest the inhibition mechanism. The DTDBT molecules are adsorbed on the C-steel surface confirming the Langmuir isotherm according to a mixed mechanism (physical and chemisorption).

*Keywords:* Benzothiazole; Gravimetry; Potentiodynamic polarization; Corrosion inhibitor; Impedance; Adsorption

* Corresponding author.