

Data and statistical interpretation of the corrosion inhibition of n,n dimethylaminoethanol, aminobenzene and 2-amino-5-ethyl-1,3,4-thiadiazole compound

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ABSTRACT

The proficiency of n,n dimethylaminoethanol (DTE), aminobenzene (ABZ) and 2-amino-5-ethyl-1,3,4- thiadiazole (THD) on austenitic steel corrosion was studied in 3M H₂SO₄ and HCl. The compounds generally performed more effectively in H₂SO₄ solution due to differences between SO₄²⁻ and Cl⁻ corrosive anion and their mode of electrochemical action. DTE performance in H₂SO₄ solution varied proportionately with its concentration with optimal inhibition value of 90.3% at 12.5% concentration. Its inhibition performance trend proves it to be an anodic type inhibitor. The performance of ABZ and THD in H₂SO₄ was observed to be distinct of time and concentration with optimal inhibition values of 97.6% and 98.9%. Their very low threshold concentration for effective performance show they are mixed type inhibitors. DTE and THD performed below average at low concentrations in HCl solution. At higher concentrations, their inhibition performance increased significantly with optimal values of 78.9% and 70.70% at 360 h. ABZ generally performed effectively in HCl solution with the lowest and highest inhibition values of 69.60% and 90.54%. Its inhibition performances were generally above 90% after 2.5% ABZ concentration. General comparison of the plots for optimal performance of the compounds shows THD is the most effective compound with respect to time, concentration and threshold level while in HCl ABZ displayed the best result. Statistical data showed inhibitor concentration strongly influenced the performance of DTE and ABZ compounds in both acids while THD performance is concentration dependent in HCl it is non-dependent on disclosure time and concentration in H₂SO₄ solution.