CHALCONE DERIVATIVES AS ANTICORROSIVE ADDITIVES FOR MILD STEEL IN ACID MEDIUM: EXPERIMENTAL AND THEORETICAL INVESTIGATIONS

Thesis submitted to the Bharathiar University in partial fulfillment of the requirements for the award of the degree of

DOCTOR OF PHILOSOPHY IN CHEMISTRY

By

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Under the guidance of

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(An Autonomous Institution - Affiliated to Bharathiar University)
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ABBREVIATIONS AND SYMBOLS

θ	-	degree of surface coverage
σ ohm/cm^2 /sec$^{-½}$	-	Warburg coefficient
μ	-	dipole moment
σ	-	global softness
χ	-	electronegativity
η	-	global hardness
ω	-	global electrophilicity
ΔE	-	energy gap
ΔG^o	-	standard free energy
ΔG°_{ads}	-	standard free energy of adsorption
ΔH^o	-	standard enthalpy
ΔH°_{ads}	-	standard enthalpy of adsorption
ΔN	-	fraction of electrons transferred
ΔS^o	-	standard entropy
ΔS°_{ads}	-	standard entropy of adsorption
$\mu A\ cm^{-2}$	-	microamperes centimeter^{-2}
$\mu F\ cm^{-2}$	-	microfarads centimeter^{-2}
A	-	electron affinity
AAS	-	atomic absorption spectrophotometry
AFM	-	atomic force microscopy
b_a, b_c	-	anodic and cathodic Tafel slopes
C_{dl}	-	double layer capacitance
Con.	-	concentration
DFT	-	density functional theory
E_a	-	activation energy
E_{corr}	-	corrosion potential
EDS	-	energy dispersive X-ray spectroscopy
f_{max}	-	frequency maximum
FTIR	-	Fourier transform infrared spectroscopy

HOMO	-	highest occupied molecular orbital
I	-	ionization potential
I_{corr}	-	corrosion current
IE	-	inhibition efficiency
K (Degree)	-	absolute temperature
LUMO	-	lowest unoccupied molecular orbital
mM	-	millimole
mg lt^{-1}	-	milligram / liter
mpy	-	mils per year
g cm^{-2} h^{-1}	-	gram/centimeter^2/hour
mV dec^{-1}	-	millivolts / decade
PZC	-	potential at zero charge
R	-	gas constant (8.314 K/J/mole)
R_{Ω}	-	ohmic resistance
R_{ct}	-	charge transfer resistance
SEM	-	scanning electron microscope
TE	-	total energy
T°C	-	temperature in degree centigrade
T (K)	-	temperature in kelvin
Wt	-	weight
XRD	-	X-ray diffraction spectroscopy
Z′, Z″	-	real and imaginary components of cell impedance