Contents

Tr	Page
Item	i
List of Figures	vii
List of Tables	
1- Introduction	
1.1- Preliminary Consideration	1
1.2 Electrochemical Nature of Steel Corrosion	2
1.2 (i) Hydrogen Ion Reduction	3
1.2. (ii) Oxygen Reduction	#=== T
1.2 Forms of Corrosion	
1.2.1. General Corrosion	
1.3.2- Galvanic Corrosion	5
1.3.3- Concentration Cell Corrosion	8
1.3.4- Pitting Corrosion	
1 2 5 Intergrapular Corrosion	
1.3.6- Stress Corrosion Cracking	
1.3.7- Dealloying	
1.3.8- Erosion Corrosion	10
1.4- Corrosion Prevention	10
1.4.1- Prevention Based on the Environment	10
1.4.2- Prevention Based on the Metal	11
1.4.2- Prevention Based on Protective Coating	11
1.4.4- Prevention Based on Electrochemistry	12
1.4.4-(i) Anodic Protection	12
1.4.4-(i) Anodic Protection 1.4.4-(ii) Cathodic Protection	12
1.4.4-(11) Camouro 1 1000000	and the second s

Contraction	<u>ents</u>
1.5- The Limitation and Uses of Inhibitors	12
1.5- The Limitation and Oses of Indiana. 1.6- Correlation Between Inhibition and Stability of Organic Compounds	13
16.1- Inhibition by Chemically Stable Surface Active Organic Compounds	13
1.6.2-Inhibition by Chemically Stable Surface Protection 1.6.2-Inhibition by Surface Active Chemically Unstable Organic Compounds	14
1.6.2-Inhibition by Surface Active Chemically Chemical Transformation	14
1.6.2.1- Types of Chemical Hanslormanich 1.7- Literature Survey on Corrosion Inhibition of Carbon Steel	16
Aim of the present work	69
Aim of the present work	
2- Experimental Techniques 2.1- Materials	70
2.1- Materials 2.1.1- Chemical Composition of Material Samples	70
2.1.1- Chemical Composition of Material Samples. 2.2- Chemical and Solutions	70
2.2- Chemical and Solutions	70
2.2.1.1-Organic Additives:	70
2.2.1.1-Organic Additives: 2.2.1.2-Sulfuric Acid. (BDH grade)	72
2.2.1.2-Sulfuric Acid. (BDH grade) 2.2.2- Solutions	72
2.2.2- Solutions 2.2.2-a- Sulfuric Acid	72
2.2.2-a- Sulturic Acid 2.2.2-b- Inhibitor Solution	72
- tal Tachniques	72
2.3- Experimental Techniques. 2.3.1- Chemical Technique (Weight Loss Method). 2.3.1- Chemical Technique (Weight Loss Method).	72
2.3.1- Chemical Technique (Weight Eost Weight 2.3.2- Electrochemical Technique (Galvanostatic PolarizationMethod)	. 73
2.3.2-(a)- Electrochemical Cell	73
2.3.2-(a)- Electrochemical Cell	75
2.3.2-(b)- Electrodes 2.3.2-(b)-i) Working Electrodes	75
2.3.2-(b)-i) Working Electrodes 2.3.2-(b)-ii) Reference Electrodes	76
2.3.2-(b)- iii) Reference Electrodes 2.3.2-(b)- iii) Auxiliary Electrodes	76
11 P1	

3- Results and discussion

Section (A)	
Studying the Corrosion Inhibition of Carbon Steel in Sulfurion	<u>2</u>
Studying the Corrosion immortion of the Line Chemical	l.
Acid by Some 5-Arylazothiazole Derivatives Using Chemical	
Technique.	70
Introduction	78
2.1 Effect of Inhibitor Concentrations	82
2.2 Adsorption Isotherms	91
Total CD Account Todide	97
- co Caul atituted Group	98
3.4- Effect of Substituted Group 3.5- Effect of Temperatures	107
December of Inhibition Process	133
3.6- Activation Parameters of Inhibition 110	
$\mathbf{C}_{\mathbf{C}}$ (i.e., \mathbf{C})	
Section (B)	
Lubibition of Carbon Steel in Sulful	r <u>ic</u>
Studying the Corrosion Inhibition of Carbon Steel in Sulfur	— sical
Acid by Some 5-Arylthiazole Derivatives Using Electrochem	<u>iicai</u>
<u>Technique</u>	
3.7- Galvanostatic Polarization Measurements	149
3.7- Galvanostatic Polarization Wedsur 3.8- Adsorption Isotherms	- 165
3.8- Adsorption Isotherms	

Section (C)

Studying the Correlation Between Inhibition Action and Chemical Structure of The Inhibitors

of the Inhibitors and Corrosion Inhibition	170
3.9- Chemical Structure of the filmotors and	177
Summary	181
Appendix	183
References	
Arabic summary	

List of Figures

Fig. (2.1):	Standard polarization cell.	75
Fig. (2.2): Fig. (2.3): Fig. (3.1):	Schematic diagram of the galvanostatic polarization circuit Weight loss-time curves for carbon steel dissolution	76 77 85
Fig. (3.2):	concentrations of compound (1) at 303K	86
Fig. (3.3):	Weight loss-time curves for carbon steel dissolution of 0.5M H ₂ SO ₄ in absence and presence of different	87
Fig. (3.4):	Weight loss-time curves for carbon steer dissolution of 0.5M H ₂ SO ₄ in absence and presence of different of sempound (4) at 303K	88
Fig. (3.5):	Weight loss-time curves for carbon steel dissortation of 0.5M H ₂ SO ₄ in absence and presence of different	89
Fig. (3.6):	The relation between logarithm of surface coverage (log o) and logarithm of inhibitor concentration (log c), (chemical	94
Fig. (3.7):	Schematic diagrams and equivalent circuits of competitive and cooperative adsorption of anion and cation	99
Fig. (3.8):	Weight loss-time curves for carbon steel dissolution in 0.5M H ₂ SO ₄ containing 5x10 ⁻⁶ M of inhibitor (4) with and without addition of various concentrations of KI at 303K	100
Fig. (3.9):	Weight loss-time curves for carbon steel dissolution in 0.5M H ₂ SO ₄ in absence and presence of 10 ⁻³ M KI and different concentrations of compound (1) at 303K	101
Fig.(3.10)	: Weight loss-time curves for carbon steel dissolution in 0.5M H ₂ SO ₄ in absence and presence of different	102
Fig. (3.11	concentrations of compound (2) at 30312): Weight loss-time curves for carbon steel dissolution in 0.5M H ₂ SO ₄ in absence and presence of different concentrations of compound (3) at 303K	103