

Contents

Chapter (I) Introduction

	Page
1.1. Corrosion.....	1
1.1.1. Definition of corrosion.....	1
1.1.2. Anodic reaction.....	1
1.1.3. Cathodic reaction.....	3
1.1.4- Several environmental factors can influence the corrosion rate	4
1.2. Type of corrosion that can be inhibited.....	4
1.3. Inhibitors.....	7
1.3.1. Type of inhibitors.....	8
1.3.2. Effect of molecular structure on corrosion inhibition.....	11
1.4. Corrosion behavior of nickel in aqueous solutions.....	14
1.4.1. Behavior of nickel in acidic solutions.....	16
1.4.2. Behavior of nickel in neutral solutions.....	20
1.4.3. Behavior of nickel in alkaline solutions.....	23
1.4.4. Pitting corrosion of nickel.....	26
1.4.5. The corrosion-inhibition of nickel.....	28
Aim and scope of the present work	36

Chapter (II) Experimental

2.1- Electrodes.....	38
2.2- Chemicals and solutions.....	39
2.3- Experimental techniques.....	41

Chapter (III) Chemical behavior of Nickel Electrode in Aqueous Solutions under Open Circuit Potential Measurement

A-Chemical behavior of nickel in aqueous solution under open circuit condition.....	47
1-Variation of the potential of nickel electrode with time in sodium carbonate or sodium chromate	48

2- Variation of the open circuit electrode potential of nickel in Na_2CO_3 or Na_2CrO_4 solutions in the presence of corrosive anions (Cl^- , Br^- , I^- and $\text{S}_2\text{O}_3^{2-}$).....	50
3- The effect of some analytical organic indicators on the corrosion of nickel electrode in carbonate or chromate solutions.....	53

Chapter (IV)

Section (A)

Kinetics of the corrosion of nickel in potassium carbonate solutions and the effect of some analytical organic indicators using electrochemical techniques

A- Galvanostatic polarization.....	80
1- The effect of the potassium carbonate concentration on the kinetics of dissolution of nickel electrode.....	81
2- The effect of addition of some analytical organic compounds on the kinetics of dissolution of nickel.....	83
B- Adsorption isotherm.....	85

Section (B)

Initiation and inhibition of pitting corrosion of Nickel Electrode in K_2CO_3 or Na_2CrO_4 solutions

A- Initiation and inhibition of pitting corrosion of nickel in K_2CO_3 or Na_2CrO_4 solutions.....	98
1- Initiation of pitting corrosion of nickel electrode.....	98
2- Effect of some analytical organic compounds on the pitting corrosion of nickel electrode under potentiodynamic anodic polarization...	103

Section (C)

Study of the correlation between inhibition action and chemical structure of the inhibitors

A- The chemical structure of the inhibitors and corrosion inhibition	126
English summary.....	130
Reference.....	134
Arabic summary	
