

CONTENTS

	Acknowledgements	...	111
	Preface	...	iv
Chapter I	Introduction	...	1
	1.1 Historical survey	...	1
	1.2 Magnitude of corrosion problem	...	2
	1.3 Aim of the present investigation	...	4
	1.4 Corrosion of metals	...	10
	1.5 Factors affecting corrosion rate	...	14
	1.6 Methods of protecting metals against corrosion	...	15
	References	...	17
Chapter II	Corrosion inhibitors	...	22
	2.1 Definition	...	22
	2.2 Classification of inhibitors	...	22
	2.3 Organic inhibitors of corrosion	...	24
	2.4 Inhibitors in acid solution	...	26
	2.5 Methods of studying inhibitors	...	27
	References	...	30
Chapter III	Mechanism of inhibitor action	...	43
	3.1 Introduction	...	43
	3.2 Inorganic inhibitors	...	43

	3.3 Organic inhibitors	...	44
	References	...	60
Chapter IV	Electrocapillary phenomena and corrosion inhibition	...	72
	4.1 Introduction	...	72
	4.2 Ideal polarised electrode	...	74
	4.3 Electrocapillarity	...	75
	References	...	99
Chapter V	Phi-scale of potentials and organic inhibitors of metallic corrosion	...	105
	5.1 Introduction	...	105
	5.2 'Null-point' of metals	...	106
	5.3 Phi-scale of potentials	...	109
	5.4 Determination of the inhibition coefficient and the rate of corrosion of iron from the electrocapillary measurements on mercury	...	118
	5.5 Methods for evaluation of surface charge, q_M	...	128
	5.6 Methods for evaluation of surface excess (Γ_{org}) of organic molecules	...	129
	References	...	131

Chapter VI	Experimental details	...	138
6.1	Capillary electrometer	...	138
6.2	Materials and chemicals	...	138
6.3	Electrical circuit	...	139
6.4	Reference electrode	...	139
6.5	Temperature controlling device	...	140
6.6	Thermostat	...	140
6.7	Measurement of interfacial tension	...	140
6.8	Corrosion rate/inhibition coefficient determination	...	142
6.9	Derived results	...	162
6.10	Error in experimental and derived results	...	181
	References	...	187
Chapter VII	Discussions	...	221
7.1	Aliphatic alcohols	...	221
7.2	Polyhydric alcohols	...	229
7.3	Thioureas	...	232
7.4	Correlation between corrosion of iron in acid solution and inhibition by organic compounds in relation to phi-potential of the corroding metal	...	237
7.5	Critical analysis of the method	...	264
	References	...	270

Chapter VIII	Conclusions	...	276
	8.1 Main conclusions	...	276
	8.2 Subsidiary conclusions	...	278
	Summary	...	xi