

CONTENTS

<i>Preface</i>	iv
<i>Acknowledgement</i>	xi
<i>List of Symbol</i>	xii
<i>List of Abbreviations</i>	xiii

CHAPTER 1 NANOCOATING - NEW DIMENSION IN CORROSION PROTECTION	1
1.1 Introduction	1
1.2 Ventilation	2
1.3 Synthesis and Characterization of Nanoparticles	3
1.4 Hybrid ZnO-SiO ₂ Nanoparticles	4
1.5 Corrosion	6
CHAPTER 2 PROPERTIES OF ZnO-SiO₂ NANOPARTICLES FOR NANOCOATING	17
2.1 Introduction	17
2.2 Nanocoating	17
2.3 Carbon Steels and its Protection	21
2.4 Aqueous Environment (Sea Water)	22
2.5 Sol-Gel	25
2.6 Particle Size	26
2.7 Zinc Oxide	27
2.8 Silica	39
2.9 Resin	50

vi Contents

CHAPTER 3 SYNTHESIS AND CHARACTERIZATION OF ZnO-SiO₂	67
3.1 Introduction	67
3.2 Phase 1: Synthesis	68
3.3 Raw Material Characterization	73
3.4 Phase 2: Preparation of Coating Sample	75
3.5 Analytical Testing	77
3.6 Morphological Characterization	79
3.7 Thermal Analysis	81
CHAPTER 4 TESTING CHARACTERISTIC OF NANOCOATING	85
4.1 Introduction	85
4.2 Mechanical Testing	86
4.3 Corrosion Testing	86
4.4 Nanoeducator	92
4.5 Nanoparticle Analysis	93
4.6 Analysis of Variance (ANOVA)	93
CHAPTER 5 ANALYSIS OF HYBRID OF ZnO-SiO₂ NANOPARTICLES	95
5.1 Introduction	95
5.2 Morphology of ZnO and SiO ₂ Nanopowder	96
5.3 X-Ray Diffraction (XRD) Analysis of ZnO and SiO ₂ Nanopowder	106