

TABLE OF CONTENTS

<i>CONTENTS</i>	Page No.
<i>LIST OF FIGURES</i>	xi
<i>LIST OF TABLES</i>	xvii
<i>LIST OF ABBREVIATIONS/SYMBOLS</i>	xviii
<i>PREFACE</i>	xix
Chapter 1 INTRODUCTION	1
Chapter 2 REVIEW OF LITERATURE	8
2.1 TRIBOLOGY	8
2.2 WEAR AND TYPES OF WEAR	9
2.2.1 FACTORS AFFECTING WEAR	11
2.3 LUBRICATION	13
2.3.1 LIQUID LUBRICATION	14
2.3.2 SOLID LUBRICATION	15
2.3.3 NEED FOR SOLID LUBRICATION	16
2.4 TECHNIQUES TO FABRICATE WEAR RESISTANT COATINGS	17
2.5 ATMOSPHERIC PLASMA SPRAY	24
2.5.1 MECHANISM OF COATING DEPOSITION	25
2.5.2 EFFECT OF DEPOSITION PARAMETER ON COATINGS	26
2.5.2.1 Effect of Arc Power	28

2.5.2.2	Plasma Gas	28
2.5.2.3	Effect of Flow Rate of Carrier Gas	29
2.5.2.4	Effect of Mass Flow Rate of Powder	29
2.5.2.5	Effect of Powder Related Variables	30
2.5.2.6	Effect of Stand-off-Distance	31
2.5.2.7	Effect of Spraying Angle	31
2.6	HIGH TEMPERATURE WEAR OF MATERIALS	32
2.7	SLIDING WEAR OF SOLID LUBRICATING COMPOSITES AND COMPOSITE COATINGS	34
2.8	FORMULATION OF THE PROBLEM	44
Chapter 3	EXPERIMENTAL PROCEDURE	46
3.1	MATERIALS USED	46
3.2	SYNTHESIS OF COATINGS	47
3.2.1	MIXING OF POWDERS	47
3.2.2	PREPARATION OF SUBSTRATE	48
3.2.3	PLASMA SPRAY COATING DEPOSITION	48
3.3	CHARACTERISATION OF COATINGS	50
3.3.1	X-RAY DIFFRACTION ANALYSIS OF COATINGS	50
3.3.2	COATING THICKNESS MEASUREMENT	51
3.3.3	HARDNESS MEASUREMENT	51
3.3.4	POROSITY MEASUREMENT	51
3.4	MICROSTRUCTURAL EXAMINATION	52

3.5	DRY SLIDING FRICTION AND WEAR TESTING	52
3.6	EXAMINATION OF WORN SURFACES	55
3.6.1	HIGH RESOLUTION SCANNING ELECTRON MICROSCOPY	55
3.6.2	X-RAY DIFFRACTION ANALYSIS AND RAMAN SPECTROSCOPY	56
Chapter 4	RESULTS AND DISCUSSION	58
4.1	RESULTS	58
4.1.1	CHARACTERIZATION OF POWDERS	58
4.1.2	CHARACTERIZATION OF COATINGS	59
4.1.3	FRICTION AND WEAR BEHAVIOR OF COATINGS	62
4.1.3.1	Room Temperature Tribological Behavior of Coatings	63
4.1.3.2	Examination of Worn Surface of Coatings	66
4.1.3.3	Worn Surface Morphology of Counterface	69
4.2	DISCUSSION	77
4.3	HIGH TEMPERATURE TRIBOLOGICAL BEHAVIOR	79
4.3.1	DRY SLIDING FRICTION AND WEAR	79
4.3.1.1	Dry Sliding Friction	79
4.3.1.2	Dry Sliding Wear	82
4.3.2	EXAMINATION OF SLIDING SURFACES	83
4.4	DISCUSSION	96
4.5	HIGH TEMPERATURE TRIBOLOGICAL BEHAVIOR OF COATINGS UNDER DIFFERENT SLIDING SPEEDS	103

4.5.1	DRY SLIDING FRICTION AND WEAR	103
4.5.2	EXAMINATION OF SLIDING SURFACES	113
4.6	DISCUSSION	142
Chapter 5 CONCLUSIONS		150
	<i>FUTURE SCOPE</i>	158
	<i>REFERENCES</i>	159
	<i>LIST OF PUBLICATIONS</i>	167