



TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	ii
LIST OF FIGURES.....	v
LIST OF TABLES.....	ix
ABSTRACT.....	xi
Chapter 1 - Introduction.....	1
1.1 Principles of Adsorption	4
1.2 Microscopic structure of adsorbed film	9
Chapter 2 - Linear regime supercritical adsorption isotherm at high pressure	10
2.1 Theoretical background	10
2.2 Saturated film density estimation $\rho_{\text{sat. film}}$	14
2.2.1 Saturated film density at 77 K (liquid N ₂)	14
2.2.2 Saturated film density at 50 K.....	18
2.3 The influence of heat of adsorption on $\rho_{\text{sat. film}}$	22
2.4 Intrapore density ρ_{ip}	24
Chapter 3 - Saturated film thickness and pore filling factors.....	27
3.1 Theoretical background	27
3.2 Saturated film thickness at cryogenic temperatures.....	28
3.3 Pore filling factors.....	31
3.4 Saturated film thickness based on the saturated film density $\rho_{\text{sat. film}}$	33
Chapter 4 - Adsorbed molecule footprint	36
4.1 Theory.....	36
4.2 Cross-sectional area of an adsorbed molecule at 77 K	37
4.3 Cross-sectional area of an adsorbed molecule at 50 K	41
Chapter 5 - Surface area determination.....	44
5.1 Overview and theory of commonly used techniques	44
5.2 Surface area determination from the saturated film density	49
5.3 Two layer BET theory	55
5.4 C value BET Theory	64



Chapter 6 - MU-7K CCHeR Sieverts apparatus	68
6.1 Design and theory	68
6.2 Skeletal density	75
6.3 Volume Determinations & Quality of Measurements	78
6.4 Fractional volume determination	81
6.5 Validation of calibration	83
6.6 Error analysis	84
6.7 Repeatability	86
Appendix.....	90
Reverences.....	98
VITA.....	101