

CONTENTS

<i>Foreword</i>	vii
<i>Preface</i>	ix
CHAPTER 1 Introduction	1
1-1. Intended Coverage	1
1-2. Historical Perspective	3
1-3. A Comment on the Following Pages	6
References	7
CHAPTER 2 The Chromatographic Process and Techniques of Separation	9
2-1. Sample Migration in the Adsorbent Bed	10
2-2. Elution from the Bed	16
2-3. Resolution and Separation. The General Elution Problem	17
2-4. Nonlinear Isotherm Separations. Variations in K with Sample Concentration	22
2-5. Chromatographic Techniques	24
Symbols Used in Chapter 2	36
References	37
CHAPTER 3 General Aspects of Adsorption	39
3-1. Fundamental Contributions to Adsorption	42
3-2. Adsorption Isotherm	52
3-3. Adsorption of Polyatomic Molecules and Spatial Arrangement of Surface Sites	60
3-4. Useful Physical Concepts in the Adsorption of Organic Molecules	63
Symbols Used in Chapter 3	70
References	71

CHAPTER 4 The Importance of Sample Size in Adsorption Chromatography. Isotherm Linearity	75
4-1. Linear Isotherms in Adsorption Chromatography	77
4-2. Dependence of Linear Capacity on Relative Sample Adsorption	83
4-3. Dependence of Linear Capacity on Other Separation Variables	87
4-4. <i>H</i> -Type Isotherms and Chemisorption	92
4-5. Preparative Scale Separations	94
Symbols Used in Chapter 4	95
References	96
CHAPTER 5 Bed Efficiency. Bandwidth versus Separation Conditions	99
5-1. General Theory	100
5-2. Bed Efficiency in Liquid Column Chromatography	111
5-3. Bed Efficiency in Thin-Layer Chromatography	118
Symbols Used in Chapter 5	122
References	123
CHAPTER 6 The General Role of Adsorbent Type and Activity	125
6-1. Significant Adsorbent Properties	127
6-2. Dependence of Sample Adsorption on Adsorbent Activity	130
6-3. Adsorbent Standardization	143
Symbols Used in Chapter 6	152
References	153
CHAPTER 7 Individual Adsorbents	155
7-1. Silica	156
7-2. Alumina	163
7-3. Other General Purpose Adsorbents	168
7-4. Group-Selective Adsorbents	172
7-5. Specific Adsorbents	177
References	181
CHAPTER 8 The Role of the Solvent	185
8-1. Primary Effect of the Solvent on Sample Adsorption. Pure Solvents	186
8-2. Solvent Mixtures	205

8-3. Secondary Solvent Effects	216
8-4. Predicting Solvent Strength	229
8-5. Other Aspects of the Solvent	234
Symbols Used in Chapter 8	237
References	239
CHAPTER 9 Gas-Solid Chromatography	241
9-1. Theory	241
9-2. Practical Aspects	249
Symbols Used in Chapter 9	253
References	254
CHAPTER 10 The Role of Sample Structure. Primary Effects	257
10-1. Contribution of Group Adsorption Energies to Sample Adsorption. The Martin Relationship	258
10-2. Localized Adsorption of the Sample	266
10-3. Predicting Group Adsorption Energies	282
10-4. Configuration of Adsorbed Sample Molecules Symbols Used in Chapter 10	288
References	291
	292
CHAPTER 11 The Role of Sample Structure. Secondary Effects	295
11-1. Variations in Group Adsorption Energy with Sample Structure	296
11-2. Contributions of Overall Sample Structure to K^0 Symbols Used in Chapter 11	320
References	331
	333
CHAPTER 12 Separation Temperature as a Variable	335
12-1. Sample Adsorption versus Temperature	335
12-2. Practical Importance of Temperature Effects Symbols Used in Chapter 12	340
References	342
	343
CHAPTER 13 Some Related Topics	345
13-1. Equipment	346
13-2. Some Special Techniques	350
13-3. Problems References	357
	362

APPENDIX I	Calculation of R'_M Values from Experimental R_F Values	365
	References	369
APPENDIX II	Characterization of Silica Samples by Silanization	371
	References	374
APPENDIX III	A Rapid Procedure for Estimating the Solvent Strengths of a Series of Binary Mixtures. Tabulated ε^0 Values for Several Binary Solvent Systems	375
APPENDIX IV	Differing Adsorption Mechanisms on Alumina and Silica	381
	References	383
APPENDIX V	Examples of the Calculation of K^0 Values in Adsorption Chromatography	385
	References	396
<i>Author Index</i>		397
<i>Subject Index</i>		407