

CONTENTS

Chapter 1	Introduction	1
1.1	Liquid versus Gas Chromatography,	2
1.2	Modern versus Traditional LC Procedures,	4
1.3	How Did Modern LC Arise?,	9
1.4	The Literature of LC,	12
Chapter 2	Basic Concepts	17
2.1	The Chromatographic Process,	17
2.2	Retention in LC,	25
2.3	Band Broadening,	29
2.4	Resolution,	35
2.5	Separation Time,	38
2.6	Sample Size Effects,	41
2.7	Band Tailing,	42
Chapter 3	Control of Separation	47
3.1	Estimating R_s ,	48
3.2	How Large Should R_s Be?,	52
3.3	Controlling Resolution: General,	63
3.4	Resolution versus k' ,	68
3.5	Resolution versus N ,	74
3.5	Resolution versus α ,	85

Chapter 4	Equipment	91
4.1	Introduction,	91
4.2	Mobile Phase Reservoirs,	94
4.3	Pumping Systems,	97
4.4	Other Units in the High-Pressure Mobile Phase Delivery System,	108
4.5	Equipment for Gradient Elution,	110
4.6	Sample Introduction Devices,	119
4.7	Columns and Column Hardware,	123
4.8	Column Thermostats,	127
4.9	Fraction Collectors,	128
4.10	Flow Rate Measurement,	129
4.11	Data Handling Systems,	130
4.12	Safety Aspects in LC,	131
Chapter 5	Detectors for Liquid Chromatography	135
5.1	Introduction,	135
5.2	Ultraviolet and Visible Photom- eters,	142
5.3	Differential Refractometers,	149
5.4	Solute Transport Detectors,	154
5.5	Radioactivity Detectors,	156
5.6	Polarography,	158
5.7	Infrared Photometry,	160
5.8	Fluorimeters,	162
5.9	Conductivity,	163
5.10	Other Detectors,	164
5.11	Summary of Detector Character- istics,	164
Chapter 6	The Column	169
6.1	Introduction,	169
6.2	Characteristics of Column Pack- ings,	172
6.3	Performance of Column Packings,	184

Chapter 6	The Column	169
	6.4 Column Packing Procedures,	187
Chapter 7	Liquid-Liquid Chromatography	197
	7.1 Introduction,	197
	7.2 Column Packings,	200
	7.3 The Partitioning Phases,	215
	7.4 Other Separation Variables,	223
	7.5 Special Problems,	224
	7.6 Applications,	226
Chapter 8	Liquid-Solid Chromatography	239
	8.1 Introduction,	239
	8.2 Column Packings,	245
	8.3 Mobile Phases,	255
	8.4 Other Separation Variables,	271
	8.5 Special Problems,	273
	8.6 Applications,	275
Chapter 9	Ion-Exchange Chromatography	283
	9.1 Introduction,	283
	9.2 Column Packings,	287
	9.3 Mobile Phases,	299
	9.4 Solvent Selectivity in Amino Acid Separations (prepared by H. J. Adler),	307
	9.5 Other Separation Variables,	315
	9.6 Special Problems,	316
	9.7 Applications,	318
Chapter 10	Gel Chromatography	329
	10.1 Introduction,	329
	10.2 Column Packings,	335

Chapter 10	Gel Chromatography	329
	10.3 Mobile Phases,	347
	10.4 Other Separation Variables,	348
	10.5 Special Problems,	353
	10.6 Applications,	359
Chapter 11	Selecting and Developing one of the Four LC Methods	373
	11.1 Introduction,	373
	11.2 Developing a Particular Separation,	381
	11.3 Selecting a Combination of Different Methods,	387
	11.4 The Use of Different Techniques,	393
Chapter 12	Large-Scale Separations (Prepared by J. J. DeStefano)	399
	12.1 Introduction,	399
	12.2 Strategy for Preparative Separations,	403
	12.3 Equipment,	406
	12.4 Columns,	409
	12.5 Operating Parameters,	416
	12.6 Applications,	424
Chapter 13	Other Topics	431
	13.1 Quantitative Liquid Chromatography,	431
	13.2 More About the Solvent,	444
	13.3 Techniques for Solving the General Elution Problem,	462
List of Symbols		483

Appendix I	Dependence of H on Experimental Conditions	489
Appendix II	Flow Relationships in LC	495
Appendix III	Resolution R_s as a Function of Column Pressure, P, Separation Time, t, and Properties of the Column (K, D, n)	497
Appendix IV	Resolution as a Function of N: Various Options for Increasing R_s	499
Appendix V	Commercially Available Equipment for Modern LC	503
Appendix VI	Comparative Column Performance	519
Subject Index		525