
INDEX

ABBREVIATIONS USED IN THE INDEX

Expt.	Experiment	HPTLC	High performance thin layer chromatography
GC	Gas chromatography	IEC	Ion exchange chromatography
GC—IR	Gas chromatography—infrared	IR	Infrared
GC—MS	Gas chromatography—mass spectrometry	LC	Liquid chromatography
GSC	Gas solid chromatography	LLC	Liquid liquid chromatography
HETP	Height equivalent to a theoretical plate	LC—MS	Liquid chromatography—mass spectrometry
HPLC	High performance liquid chromatography	PC	Paper chromatography
HPLC—IR	High performance liquid chromatography—infrared	PEI	Polyethylene imine
HPLC—MS	High performance liquid chromatography—mass spectrometry	PLOT	Porous layer open tubular (column)
HPLC—UV	High performance liquid chromatography—ultraviolet	RI	Refractive index
		SCOT	Surface coated open tubular (column)
		WCOT	Wall coated open tubular (column)
		UV-visible	Ultraviolet-visible

A

- Absorbance ratioing techniques in HPLC 239
- Acylation of samples for GC 149
- Adsorbents
 - for columns in LC 92
 - for GSC 200
 - for thermal desorption in GC 153
 - for TLC 26, 127
 - in LC 92
- Adsorption
 - in HPLC 214
 - isotherms in LC 93
 - sampling for GC 153
- Adsorption chromatography
 - in LC 90
 - in HPLC 258
- Advances in TLC 49
- Affinity chromatography 129
- Affinity methods in HPLC 217
- Agarose for electrophoresis 77
- Agarose gels for
 - gel LC 123
 - ion exchange LC 114
- Alkali bead flame ionization detector for GC 167
- Alkylation of samples for GC 150
- Alumina for TLC 29
- Alumina adsorbent for
 - GSC 200
 - LC 94
- Analog to digital converters 327, 328
- Application of samples in TLC 34
 - GC 191
 - gel LC 126
 - HPLC 285
 - microcolumn HPLC 285
 - PC 69
 - PC, solvent systems 59
- Application examples of partition LC 97
- Applications, head space analysis in GC 191
- Argon ionization detector for GC 178
- Ascending development in TLC 38
- Atmospheric pollutants analysis by GC 197
- Atomic absorption for GC and HPLC 320

- Automatic sample introduction for GC 152
- Automatic thermal desorption in GC 154

B

- Band broadening 17
 - in HPLC 223, 226
- Baseline correction in data processing 331
- Beer analysis by GC 192
- Blood alcohol analysis by GC 192
- Bonded stationary phases for HPLC 260, 263
- Buffers for electrophoresis 74

C

- Calculation of peak areas for data processing 329
- Capacity factor 16
- Capacity of ion exchange resins in LC 103
- Capillary column
 - GC 179
 - injection techniques in GC 188
- Capillary columns
 - comparison of in GC 181
 - fused silica for GC 187
 - performance in GC 186
 - PLOT for GC 181, 183
 - SCOT for GC 181, 182
 - thick film WCOT for GC 186
 - types of for GC 181
 - WCOT for GC 181, 182
- Carbon absorbent for GSC 202
- Carrier gas
 - flow meter for GC 142
 - systems for GC 140
 - thermal conductivity in GC 141
 - viscosity in GC 141
- Cation exchange separation of metal ions 369
- Celite for TLC 28
- Cellulose
 - for ion exchange LC 115
 - for partition LC 96
 - for TLC 29
- Cellulose acetate for electrophoresis 76

- Cellulose ion exchange papers for PC 55
- Characteristics of detectors for HPLC 254
- Chart recorders 322
- Chemical detection in TLC 44
- Chemical ionization source in mass spectrometry 296
- Chemically bonded stationary phases for HPLC 260, 263
- Chiral stationary phases for HPLC 266
- Choice of stationary phases in GC 161
- Chromasorb polymers for GSC 207
- Chromatofocussing 132
- Chromatographic procedures 5
- Chromatographic requirements for spectroscopy 292
- Chromatography experiments 340
- Classification of chromatography 5
- Clausius-Clapeyron equation applied to GC 157
- Column capacity in GC 139
- Column efficiency 16
 - in HPLC 221
- Column ovens for GC 156
- Column packing material in HPLC 218
- Column parameters in gel LC 117
- Column switching in GC 144
- Column temperature in GC 156
- Column venting in GC 144
- Columns
 - for gel LC 124
 - for HPLC 220
 - for LC 86
 - in GC 156
 - packed for GC 158
- Computer hardware for data processing 328
- Computer software for data processing 329
- Conductivity detectors
 - for GC 177
 - for HPLC 245
- Constant pressure pumps for HPLC 228
- Continuous development in TLC 39
- Covalent chromatography 132

D

- Data collection and processing 326
 - for GC—HPLC—IR 313

- Data processing
 calculation of peak areas 329
 in chromatography 322
 normalized peak areas 330
 software 329
 techniques 327
 baseline correction 331
 internal standard 330
 optimization techniques 336
 overlapping peaks 331
 peak detection 330
 peak enhancement 338
 standard addition 330
- Data systems for GC—MS, HPLC—MS 306
- Definition of chromatography 2
- Deflection refractometer detector for HPLC 247
- Densitometer detection in TLC 45
- Derivatization
 for peak enhancement 338
 of samples for GC 148
 of samples for HPLC 253
- Descending development in TLC 38
- Desolvation detectors for HPLC 250
- Detection in TLC 44
- Detection of solutes in PC 65
- Detector linearity in GC 164
- Detector performance in GC 163
- Detector response factors in GC 165
- Detector response of electron capture detector 174
- Detector signal to noise ratio in GC 163
- Detectors
 for GC 162
 for HPLC 219, 237, 254
 minimum detection level in GC 164
- Development methods 7
 in PC 62
- Development of TLC plates 36
- Dextran gels for gel LC 122
- Dextrans for ion exchange LC 112
- Diatomaceous earths for partition LC 96
- Diffusion effects in HPLC 227
- Digitization of chromatographic signals 326
- Diode array
 detector for HPLC 239
 UV-visible detector for HPLC—UV 317
- Dipole moments 13
- Discontinuous electrophoresis 81
- Dispersion retention forces 14
- Distribution coefficient 11
- Double focussing analysers for mass spectrometry 297
- Drugs analysis by GC 194
- Dual column analysis in GC 196
- Dual detector analysis in GC 195
- E**
- Eddy diffusion 18
- Effective carbon number contribution in GC 167
- Effective number of plates in a column 16
- Efficiency 19
 effects of 20
- Effusion separator for GC—MS 300, 301
- Electrochemical detectors for HPLC 243
- Electron capture detector
 for GC 172
 for HPLC 250
 response in GC 174
- Electron impact ion source in mass spectrometry 295
- Electrophoresis 70
 agarose for 77
 buffers 74
 cellulose acetate for 76
 discontinuous 81
 experiments 352
 gel methods for proteins expt. 7 353
 gels 76
 high voltage 79
 immuno 81
 isoelectric focusing 80
 low voltage 78
 low voltage methods expt. 6 352
 migration rate 70
 paper 75
 polyacrylamide gels 77
 Sephadex for 77
 starch for 76
 supporting media 74
 techniques 78
 thin layer 78
 zone 71

- Elution
 development 8
 procedures in LC 87
 Elutropic series of solvents for TLC 42
 Environmental analysis by GC 196
 Equilibrium plate height 16
 Equilibrium processes 17
 in PC 59
 Exclusion methods in HPLC 216
 Experiments in chromatography 340
 1 PC ascending separation of metal ions 342
 1 PC horizontal separation of metal ions 342
 2 PC ascending separation of Cu, Co, Ni 343
 3 PC separations on ion exchange paper 345
 4 PC separation of amino acids 347
 4 PC two way development separations 347
 5 PC development by Kawerau technique 350
 6 low voltage electrophoresis amino acids 352
 7 gel electrophoresis of proteins 353
 8 isoelectric point gel electrofocusing 356
 9 preparation of TLC plates 359
 9 separation of amino acids by TLC 359
 10 use of fluorescent silica TLC plates 362
 11 separation of sugars by TLC 362
 11 use of modified silica TLC plates 362
 12 multiple development TLC 365
 12 separation of analgesics by TLC 365
 13 LC separation using alumina columns 366
 14 capacity of ion exchange LC columns 367
 14 ion exchange LC 367
 15 cation exchange LC of metal ions 369
 16 LC purification of proteins on DEAE 370
 17 gel filtration of dextrans and vitamins 373
 18 GC separation of alcohols 376
 19 GC analysis of ethanol in solution 377
 20 GC analysis of barbiturates 381
 21 GC qualitative analysis using two columns 382
 22 GC analysis of pesticides using ECD 386
 23 GC a study of parameters 387
 24 HPLC analysis of barbiturates 392
 24 HPLC reverse phase analyses 392
 25 HPLC ion pair analysis of vitamins 394
 26 HPLC techniques, analysis of analgesics 396
 27 HPLC DNP derivatives of amino acids 399
 28 HPLC of inorganic ions 401
- F**
- Flame detectors for HPLC 252
 Flame ionization detector for GC 165
 Flame photometric detector for GC 170
 Flavours analysis by GC 192
 Flow meter for carrier gas in GC 142
 Fluorescence detectors for HPLC 241
 Food analysis by GC 193
 Forces affecting retention 13
 Fourier transform IR instrumentation 311
 Fractional elution in LC 88
 Fresnel refractometer detector for HPLC 247
 Frontal analysis 9
 Fused silica capillary columns for GC 187
- G**
- Gas chromatography 137
 applications 191
 capillary columns 179
 carrier gas systems 140
 columns 156
 derivatization of samples 148
 detectors 162
 instrumentation 140
 IR technique 311
 MS technique 294

principles 137
 stationary phases 160
 Gas density balance detector for GC 176
 Gas solid chromatography 198
 Gaseous samples for GC 146
 Gaussian peaks 12, 20
 Gel chromatography in LC 115
 Gel filtration of dextrans and vitamins 373
 Gel ion exchangers
 for IEC 111
 for LC 111
 Gel LC 115
 agarose gels 123
 applications 126
 column parameters 117
 columns 124
 dextran gels 122
 gels available 121
 media available 121
 methodology 124
 nature of 120
 polyacrylamide gels 123
 polyacrylomorpholine gels 123
 polystyrene 123
 polyvinyl acetate gels 123
 sample preparation 124
 separation parameters 117
 silica gels 124
 Gel permeation in HPLC 216
 Giddings 3, 17
 Glass for gel LC 124
 Gradient elution
 for in TLC 41
 in HPLC 232
 in LC 89
 GSC 198
 adsorbents 200
 alumina adsorbent 200
 carbon adsorbent 202
 chromosorb polymers properties of 207
 Langmuir isotherms 198
 linear chromatography 199
 microporous polymers 206
 molecular sieve adsorbent 203
 PLOT columns 201
 Porapak retention properties 204
 Silica gel adsorbent 201
 Tenax—GC polymers 208
 XAD amberlite resins 202

H

Head space analysis, applications in GC 191
 Head space sampling for GC 151
 Helium ionization detector for GC 178
 HETP 16
 High performance liquid chromatography 212
 High performance TLC 27
 High pressure solvent mixing in HPLC 233
 High voltage electrophoresis 79
 History of chromatography 1
 HPLC-atomic absorption techniques 321
 HPLC—IR
 data collection and processing 313
 for sample cell 312
 techniques 311
 HPLC—MS 251
 data systems 306
 interfaces 302
 magnetic analysers 297
 mass analysers 297
 moving belt interface 251, 302
 quadrupole mass analyser 298
 techniques 294
 thermospray interface 303, 306
 HPLC-spectroscopy requirements 292
 HPLC—UV diode array detector 317
 HPTLC 27

I

IEC
 agarose resins 114
 cellulose resins 115
 characteristics of resins 98
 dextran resins 112
 inorganic resins 108
 liquid ion exchangers 110
 methods of 105
 resins 106
 resins available 100
 Immuno-electrophoresis 81
 Information from peaks in GC 138
 data collection and processing 313

Infrared
 detectors for HPLC 243
 Fourier transform instrumentation 311
 spectrophotometry for chromatography 311

Injection of sample in HPLC 235

Injection systems for microcolumn HPLC 284

Injection techniques
 in GC 188
 in HPLC 220

Injection valves (multiport), for GC 142

Inlet sampling systems in GC 145

Inlet system for mass spectrometry 294

Inorganic ion exchange resins for LC 108

Inorganic materials analysis by GC 195

Inorganic resins for IEC 106

Instrumentation
 for GC 140
 for HPLC 217

Integrators 324

Interfaces for HPLC—MS 302

Interfacing for GC—MS 298

Internal standard 22
 in data processing 330

Ion exchange
 cellulose papers for PC 55
 chromatography in LC 98
 chromatography methods of 105
 HPLC 267
 methods in HPLC 216
 PC 55
 resins, capacity of 103
 resins for LC 100
 resins, selectivity of 103

Ion pair partition in HPLC 216

Ion pairing techniques in HPLC 270

Ion source for mass spectrometry 295

IR—GC, HPLC techniques 311

Isoelectric focusing
 electrophoresis 80

Isoelectric point gel electrophoresis
 expt. 8 356

IUPAC definition of chromatography 2

K

Katherometer detector for GC 174

Kieselguhr for TLC 28

Kinetics of separations 15

Kovat's retention index for GC 161

L

Langmuir isotherms in GSC 198

Linear GSC 199

Liquid chromatography experiments 366

Liquid column chromatography LC, LLC 85

Liquid ion exchangers for LC 110

Liquid liquid partition chromatography in HPLC 260

Liquid liquid partition in HPLC 215

Liquid sample inlet systems for GC 146

Locating agents for TLC 45

Location of solutes in TLC 44

London's dispersion forces 14

Longitudinal diffusion 19

Loop injection valves in HPLC 236

Low pressure solvent mixing in HPLC 232

Low voltage electrophoresis 78

M

Magnetic analysers for GC—MS, HPLC—MS 297

Mass analysers for GC—MS, HPLC—MS 297

Mass spectrometers 294

Mass spectrometric detection in HPLC 251

Mass spectrometry
 chemical ionization source 296
 data systems 306
 electron impact ion source 295
 inlet system 294
 ion sources 295
 mass analysers 297

Mass transfer 17, 19

McReynolds' retention index numbers in GC 160, 162

Membrane diffusion separator for GC—MS 300, 301

Metal chelates analysis by GC 195

Method development for HPLC 273, 274

Methodology of gel LC 124

Methods of ion exchange LC 105

Microbore columns for HPLC 279, 280
 Microbore instrumentation for HPLC 283
 Microcapillary packed columns for HPLC 282
 Microcolumn HPLC applications 285
 Microcolumn instrumentation for HPLC 283
 Microcolumns for HPLC 279, 280
 Microcomputer
 hardware for data processing 328
 interfacing for data collection 326
 Microporous polymers for GSC 206
 Microwave plasma detector for GC 321
 Migration rate in electrophoresis 70
 Minimum detection level of GC detectors 164
 Miscellaneous detectors for GC 176
 Miscellaneous for HPLC 253
 Modes
 of chromatography in LC 90
 of HPLC 214
 Molecular jet separator for GC—MS 300, 301
 Molecular sieve
 adsorbent for GSC 203
 for TLC 30
 Moving belt interface
 for HPLC—MS 251, 302
 Multiple development in TLC 39
 Multiport injection valves in GC 143

N

Narrow bore packed columns for HPLC 282
 N_{eff} 16
 Nitrogen phosphorus detector for GC 167
 Normalized peak areas for data processing 329
 Normalizing 21
 Number plates in a column 16

O

On column injection in GC 145
 Open split interface for GC—MS 300, 301
 Open tubular columns for HPLC 281

Optimization techniques in chromatography 336
 Organic semiconductor detectors for GC 179
 Organo bonded partition in HPLC 215
 Ovens for GC columns 156
 Overlapping peaks in data processing 331

P

Packed column stationary phases for GC 159
 Packed columns for GC 158
 Packing columns in LC 86
 Packing material for size exclusion HPLC 272
 Packing materials for columns in HPLC 264
 Paper chromatography 50
 experiments 342
 Paper
 for electrophoresis 75
 types of, for PC 53
 Particle size in ion exchange LC 102
 Partition chromatography in LC 94
 Partition coefficient 15
 Partition in HPLC 215
 Peak area calculation in data processing 329
 Peak detection in data processing 330
 Peak shape 12, 20
 Peak symmetry in GC 139
 PEI for TLC 30
 Pesticides analysis by GC 197
 Phosphorus nitrogen detector for GC 167
 Photodiode array spectrophotometers in HPLC 239
 Photometric detector for GC 170
 Plane chromatography 24
 Plate height 16
 Plates for TLC 31
 development 36
 PLOT capillary columns for GC 181, 183
 PLOT columns for GSC 201
 Polar retention forces 13
 Pollutants analysis by GC 197
 Polluted waters analysis 197
 Polyacrylamide gels
 for electrophoresis 77
 for gel LC 123

Polyacryloylmorpholine for gel LC 123
 Polyamide for TLC 30
 Polystyrene for gel LC 123
 Polyvinyl acetate for gel LC 123
 Porapak retention properties for GSC 204
 Porous layer open tubular columns for GC 181, 183
 Practical aspects of LC 86
 Preparation
 of adsorbents in LC 93
 of samples for GC 146
 of TLC plates 31
 Preparative methods in TLC 48
 Preparative PC 68
 Preparative techniques in HPLC 277, 278
 Principles
 of GC 137
 of HPLC 212
 Processing
 chromatographic data 326
 of chromatographic data 322
 Pumps for HPLC 219, 228
 Pyrolysis
 GC applications 195
 of samples for GC 152

Q

Quadrupole mass analyser for GC—MS, HPLC—MS 298
 Quantitation 21
 Quantitative analysis in HPLC 276
 Quantitative PC 66
 Quantitative TLC 66
 Quaternary gradient solvent systems in HPLC 233

R

Radial development
 in PC 64
 in TLC 39
 Radioactivity detectors for HPLC 246
 Radiochemical detection in TLC 47
 Random walk theory 17
 Rate theory in HPLC 223
 Reciprocating pumps for HPLC 229

Recording the chromatographic signal 322
 Refractive index detectors for HPLC 246
 Relative response factors 21
 Relative retention (α) 16
 Removal of spots in PC 67
 Requirements for spectroscopic detection 292
 Resin characteristics in IEC 98
 Resins
 available for IEC 100
 capacity of, in IEC 103
 for IEC 106
 for ion exchange LC 100
 (inorganic) for IEC 106
 selectivity of, in IEC 103
 Resolution 19, 20
 in GC 139
 Response factors 21
 of detectors for GC 165
 Retention characteristics 14
 in HPLC 221
 Retention factors 13
 Retention properties of Porapak resins for GSC 204
 Reverse phase chromatography in HPLC 265
 Reverse phase HPLC 215
 Reverse phase materials for HPLC 263
 Reverse phase PC 56
 Reverse phase TLC 28
 RF values in TLC 35
 RI detectors for HPLC 246

S

Salting-out chromatography in LC 108
 Sample acylation for GC 149
 Sample alkylation for GC 150
 Sample application
 in LC 87
 in PC 64
 in TLC 34
 Sample cell
 for GC—IR 312
 for HPLC—IR 312
 Sample derivatization
 for GC 148
 for HPLC 253
 Sample injection in HPLC 235

- Sample inlet systems in GC 144
 - Sample introduction
 - automatic, for GC 152
 - in HPLC 235
 - Sample preparation
 - for GC 146
 - for gel LC 124
 - in PC 52
 - Sample pyrolysis for GC 152
 - Sample silylation for GC 148
 - Samples
 - gaseous for GC 146
 - liquid inlet systems for GC 146
 - Sampling
 - by adsorption for GC 153
 - head space method for GC 151
 - techniques for GC 148
 - SCOT capillary columns for GC 181, 182
 - Selectivity of ion exchange resins in LC 103
 - Separation parameters in gel LC 117
 - Separation process 14
 - Sephadex for electrophoresis 77
 - Shearing interferometer detector for HPLC 249
 - Signal to noise ratio of detectors in GC 163
 - Silanized silica gel for TLC 28
 - Silica
 - adsorbent for LC 93
 - capillary columns for GC 187
 - for gel LC 124
 - Silica gel
 - adsorbent for GSC 201
 - for partition LC 95
 - for TLC 26
 - Silicon chip GC 179
 - Silylation of samples for GC 148
 - Size exclusion HPLC 271
 - Small bore packed columns for HPLC 282
 - Software for data processing 329
 - Solid state detectors for GC 178
 - Solid supports in partition LC 95
 - Solvent delivery systems
 - for HPLC 228
 - for microcolumn HPLC 283
 - Solvent mixtures for TLC applications 43
 - Solvent systems
 - for adsorption HPLC 259
 - for PC applications 59
 - Solvents
 - elutropic series for TLC 42
 - for adsorption LC 91
 - for HPLC 219
 - for partition LC 96
 - for PC 58
 - for TLC 41
 - Spectroscopic detection, requirements 292
 - Spectroscopy techniques for chromatography 291
 - Split/splitless injector for GC 145, 188
 - Splitter injection method 189
 - Spreaders for TLC plates 31
 - Standard addition 23
 - in data processing 330
 - Starch for electrophoresis 76
 - Stationary phase choices in GC 161
 - Stationary phases
 - for GC 160
 - for packed columns in GC 159
 - specialized types for GC 162
 - Stepwise development in TLC 39
 - Stepwise elution in LC 88
 - Supercritical GC 190
 - Supercritical properties of gases 190
 - Supporting media for electrophoresis 74
 - Surface coated open tubular columns for GC 181, 183
 - Synthesis of bonded stationary phases for HPLC 261
 - Syringe pumps for HPLC 229
 - Syringe sample injection in HPLC 235
 - Syringes for GC 147
- ## T
- Techniques
 - of electrophoresis 78
 - of PC 51
 - Temperature effects in HPLC 227
 - Tenax—GC polymers for GSC 208
 - Theoretical aspects 11
 - Theory of HPLC 221
 - Thermal conductivity
 - detector for GC 174
 - of carrier gases in GC 141
 - Thermal desorption sampling for GC 154
 - Thermodynamics of separations 15

Thermospray interface for HPLC—MS
303, 306
Thick film WCOT columns for GC 186
Thin layer electrophoresis 78
Transport detectors for HPLC 250
Tswett 1, 2
Two dimensional development in TLC
39

U

Ultraviolet detectors
for HPLC 237
in TLC 45
UV-visible spectrophotometry for
chromatography 315

V

Valve sample injection in HPLC 235
Van Deemter
equation 18
rate theory in HPLC 223
Venting columns in GC 144

Viscosity of carrier gases in GC 141
Vitreous silica capillary columns for GC
187

W

Wall coated open tubular columns for
GC 181, 182
Water analysis for pollutants by GC 197
WCOT capillary columns for GC 181,
182
Wheatstone bridge detector circuit in GC
175

X

X/T recorders 322
XAD amberlite resins for GSC 202

Z

Zone electrophoresis 71