

Contents

Preface ix

1 Physical and Chemical Properties

I. Nomenclature	1
II. Physical Properties	3
III. Chemical Properties	11
References	14

2 Occurrence

I. Formation	17
II. Sources	25
III. Distribution	26
References	44

3 Toxicology and Metabolism

I. Introduction	50
II. Toxicity	51
III. Biological Testing	53
IV. Structure–Activity Relationships	55
V. Binding of PAC to Cellular and Subcellular Units	60
VI. Metabolism	62

VII. Analytical Methods	70
References	73
4	Collection, Extraction, and Fractionation
I. Introduction	78
II. Collection and Extraction	79
III. Concentration and Clean-Up	93
IV. Selected Analytical Schemes	105
V. Isolation of the Nitrogen Heterocycle Fraction	111
VI. Isolation of the Sulfur Heterocycle Fraction	116
References	116
5	Column, Paper, and Thin-Layer Chromatography
I. Introduction	123
II. Column Adsorption Chromatography	123
III. Paper and Thin-Layer Chromatography	133
IV. Gel Permeation Chromatography	143
References	152
6	High-Performance Liquid Chromatography
I. Introduction	156
II. Chromatographic Columns	158
III. Gradient Elution Techniques	175
IV. Detection Systems	177
V. Capillary and Microbore Columns	183
References	186
7	Gas Chromatography
I. Introduction	188
II. Stationary Phases	189
III. Capillary Gas Chromatography	201
IV. Detectors and Ancillary Techniques	220
V. Supercritical-Fluid Chromatography	236
References	239

8 Mass Spectrometry

I. Introduction	242
II. Electron Impact	242
III. Chemical Ionization and Negative Ions	269
IV. Metastable Ions and Collision Spectroscopy	278
V. Field Ionization and Field Desorption	282
VI. Photoionization	285
References	286

9 Ultraviolet Absorption and Luminescence Spectroscopy

I. Introduction	290
II. Ultraviolet Absorption	291
III. Fluorescence	295
IV. Phosphorescence	304
V. Selective Quenching in Luminescence Analysis	308
VI. Low-Temperature Luminescence	311
VII. New Luminescence Methods	322
References	333

10 Nuclear Magnetic Resonance and Infrared Spectroscopy

I. Introduction	339
II. Continuous-Wave ^1H NMR	342
III. Pulse Fourier-Transform NMR	342
IV. Fourier-Transform IR	346
References	349

11 Approaches to Problem Solving in PAC Analysis

I. Introduction	351
II. Priority Pollutants in Contaminated Water	352
III. Analysis of Methylchrysenes	353
References	362

Appendix 1: Polycyclic Aromatic Hydrocarbons: Names, Formulas, Structures, and Numbering	363
Appendix 2: Polycyclic Aromatic Heterocycles Containing One Nitrogen Atom: Names, Formulas, Structures, and Numbering	387
Appendix 3: Polycyclic Aromatic Heterocycles Containing One Sulfur Atom: Names, Formulas, Structures, and Numbering	421
Appendix 4: Polycyclic Aromatic Heterocycles Containing One Oxygen Atom: Names, Formulas, Structures, and Numbering	437
Appendix 5: Polycyclic Aromatic Compounds That Have Been Tested for Carcinogenic Activity	441
Index	451