Contents

Part I
Analytical Chemistry 1

1 In-situ Method for Analyzing the Long-Term Behavior of Particulate Metal Phases in Soils 3
2 Analysis of Toxic Metals by Micro Total Analytical Systems (μTAS) with Chemiluminescence 13
3 Diffuse Infrared Fourier Transform Spectroscopy in Environmental Chemistry 19
4 Detection of Biomarkers of Pathogenic Bacteria by Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry 31
5 Multi-Isotopic Approach (^{15}N, ^{13}C, ^{34}S, ^{18}O and D) for Tracing Agriculture Contamination in Groundwater 43
6 ^{2}H and ^{18}O Isotopic Study of Ground Waters under a Semi-Arid Climate 57
7 $^{13}C/^{12}C$ Ratio in Peat Cores: Record of Past Climates 65
8 Isotopic Composition of Cd in Terrestrial Materials: New Insights from a High-Precision, Double Spike Analytical Method 75
9 Organic Petrology: A New Tool to Study Contaminants in Soils and Sediments .. 89
10 The Comminution of Large Quantities of Wet Sediment for Analysis and Testing with Application to Dioxin-Contaminated Sediments from Lake Ontario 99
11 Study on the Large Volume Stacking Using the EOF Pump (LVSEP) for Analysis of EDTA by Capillary Electrophoresis 107

Part II
Toxic Metals 119

12 A Framework for Interpretation and Prediction of the Effects of Natural Organic Matter Heterogeneity on Trace Metal Speciation in Aquatic Systems .. 121
13 Binding Toxic Metals to New Calmodulin Peptides 133
14 Leaching of Selected Elements from Coal Ash Dumping 145
15 Storm-Driven Variability of Particulate Metal Concentrations in Streams of a Subtropical Watershed 153
16 A Model for Predicting Heavy Metal Concentrations in Soils 177
17 Phytoremediation of Thallium Contaminated Soils by Brassicaceae 187

18 Mercury Recovery from Soils by Phytoremediation 197
19 Effect of Cadmium and Humic Acids on Metal Accumulation in Plants 205
20 Selection of Microorganisms for Bioremediation of Agricultural Soils Contaminated by Cadmium 215
21 Electrodialytic Remediation of Heavy Metal Polluted Soil 223
22 Electrodialytic Removal of Cu, Cr and As from Treated Wood 235
23 Treatment of Wastewater Contaminated by Mercury by Adsorption on the Crandallite Mineral 243
24 Low Cost Materials for Metal Uptake from Aqueous Solutions 251
25 Removal of Copper(II) and Cadmium(II) from Water Using Roasted Coffee Beans 259

Part III
Organic Pollutants 267

26 Bioremediation for the Decolorization of Textile Dyes – A Review 269
27 Degradation of the Indigo Carmine Dye by an Anaerobic Mixed Population ... 289
28 Biodegradation of Benzothiazoles by *Rhodococcus* Bacteria Monitored by ^{1}H Nuclear Magnetic Resonance (NMR) 295
29 Biotransformation of Nonylphenol Surfactants in Soils Amended with Contaminated Sewage Sludges 305
30 Quantification of in-situ Trichloroethene Dilution versus Biodegradation Using a Novel Chloride Concentration Technique 317
31 Anthropogenic Organic Contaminants Incorporated into the Non-Extractable Particulate Matter of Riverine Sediments from the Teltow Canal (Berlin) .. 329
32 Behaviour of Dioxin in Pig Adipocytes 353
33 Control of Halogenated By-Products During Surface Water Potabilisation .. 361
34 Organic Pollutants in Airborne Particulates of Algiers City Area 371
35 A Reactive Transport Model for Air Pollutants 383

Part IV
Polycyclic Aromatic Compounds 391

36 Analysis of High-Molecular-Weight Polycyclic Aromatic Hydrocarbons by Laser Desorption-Ionisation/Time-of-Flight Mass Spectrometry and Liquid Chromatography/Atmospheric Pressure Chemical Ionisation Mass Spectrometry 393
37 Atmospheric Polycyclic Aromatic Hydrocarbons (PAHs) in Two French Alpine Valleys 409
38 Evaluation of the Risk of PAHs and Dioxins Transfer to Humans via the Dairy Ruminant 419
39 Polycyclic Aromatic Hydrocarbons (PAHs) Removal during Anaerobic and Aerobic Sludge Treatments 431
40 Photodegradation of Pyrene on Solid Phase 441
41 Degradation of Polycyclic Aromatic Hydrocarbons in Sewage Sludges by Fenton's Reagent 449

Part V
Pesticides 461

42 Pesticide Mobility Studied by Nuclear Magnetic Resonance 463
43 Photo- and Biodegradation of Atrazine
in the Presence of Soil Constituents 473
44 Behaviour of Imidacloprid in Fields. Toxicity for Honey Bees 483
45 Impact of a Sulfonylureic Herbicide on Growth
of Photosynthetic and Non-Photosynthetic Protozoa 495
46 Abiotic Degradation of the Herbicide Rimsulfuron on Minerals and Soil 505
47 Binding of Endocrine Disrupters and Herbicide Metabolites
to Soil Humic Substances 517
48 Potential Exposure to Pesticides during Amateur Applications
of Home and Garden Products 529

Part VI
Green Chemistry 539

49 Carbon Dioxide, a Solvent and Synthon for Green Chemistry 541
50 Mechanochemistry:
An Old Technology with New Applications to Environmental Issues.
Decontamination of Polychlorobiphenyl-Contaminated Soil
by High-Energy Milling in the Solid State with Ternary Hydrides 553
51 Development of a Bioreactor for Cometabolic Biodegradation
of Gas-Phase Trichloroethylene 561
52 Enhanced Solubilization of Organic Pollutants
through Complexation by Cyclodextrins 569
53 Chemical Samples Recycling:
The MDPI Samples Preservation and Exchange Project 585
54 Photodecomposition of Organic Compounds in Aqueous Solution
in the Presence of Titania Catalysts 591
55 Depollution of Waters Contaminated by Phenols and Chlorophenols
Using Catalytic Hydrogenation 601
56 Treatment of Wastewater Containing Dimethyl Sulfoxide (DMSO) 615
57 Productive Use of Agricultural Residues:
Cements Obtained from Rice Hull Ash 621

Part VII
Ecotoxicology 629

58 Environmental Metal Cation Stress and Oxidative Burst in Plants.
A Review 631
59 The LUX-FLUORO Test as a Rapid Bioassay
for Environmental Pollutants 645
60 Effects of Two Cyanotoxins, Microcystin-LR and Cylindrospermopsin,
on *Euglena gracilis* 569

61 A New Bioassay for Toxic Chemicals Using Green Paramecia, *Paramecium bursaria* 673
62 Detection of Toxic Pollution in Waste Water by Short-Term Respirometry 681
63 Environmental Biosensors Using Bioluminescent Bacteria 691
64 Evaluation of Water-Borne Toxicity Using Bioluminescent Bacteria 699
65 Bacteria-Degraders Based Microbial Sensors for the Detection of Surfactants and Organic Pollutants 707
66 Study of Cr(VI) and Cd(II) Ions Toxicity Using the Microtox Bacterial Bioassay 725
67 Cultured Human Cells as Biological Detectors for Assessing Environmental Toxicity 735
68 Genotoxic Impact of Erika Petroleum Fuel on Liver of the Fish *Solea solea* .. 743
69 Heavy-Metal Resistant Actinomycetes 757

Index 769