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Jochen Hoefs

# Stable Isotope Geochemistry

Eighth Edition

 Springer

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## Preface

The seventh edition of “Stable Isotope Geochemistry” has been published 3 years ago. Recent advances in multi-collector ICP mass spectrometry have made high-precision isotope measurements possible for most elements of the periodic table. In the last edition, 30 elements with resolvable natural variations in isotope composition have been discussed; the new edition presents data for 42 elements. This increase in elements, together with advances in the calculation of equilibrium isotope fractionation using *ab initio* methods, has led to an unbelievable rise of publications, making substantial major revisions and extensions of the last edition necessary.

The general structure of the book has been kept. Chapter 1 gives a general introduction to the theoretical and experimental principles. A new section on medical applications has been included.

Chapter 2 gives an overview of natural isotope variations of 42 elements. In earlier editions, elements have been listed with increasing atomic number. In the new edition, Chap. 2 is divided into two parts: Part I discusses the “Traditional” isotope elements carbon, hydrogen, oxygen nitrogen, and sulfur (so-called CHONS), measured by gas-source mass spectrometry. Part II presents the “Non-traditional Isotopes,” measured predominantly by multi-collector inductively coupled mass spectrometry. At places elements with close geochemical relationships are discussed successively. Special emphasis has been given to developments that took place over the last three years while still summarizing the important discoveries made before that time. Conclusions from the newly added elements rely sometimes on a very limited database; future studies have to strengthen some of the inferences. In total, Chap. 2 has been enlarged by about 30%.

As in earlier editions, the third part discusses natural variations of isotope compositions in the context of the classic geochemical “Spheres.” New findings from non-traditional isotope systems have been incorporated. A very long list of references with many new citations enables a quick access to the exponentially growing recent literature. Nevertheless, I have neglected a number of recent references, because the citation list encompasses already about 30% of the book.

Again, I have tried to provide a contemporary overview of the entire field of stable isotope geochemistry. I hope I am presenting a well-balanced discussion, although I am fully aware of omissions and shortcomings.

Michael Böttcher and Stefan Weyer are thanked for reviewing Chap. 2, and Klaus Simon has been of great help during the preparation of the manuscript. I take, however, responsibility for any shortcoming.

Göttingen, Germany

Jochen Hoefs

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# Contents

<b>1</b>	<b>Theoretical and Experiment Principles</b>	<b>1</b>
1.1	General Characteristics of Isotopes	1
1.2	Isotope Effects	3
1.3	Isotope Fractionation Processes	5
1.3.1	Isotope Exchange	5
1.3.1.1	Fractionation Factor ( $\alpha$ )	7
1.3.1.2	The Delta Value ( $\delta$ )	8
1.3.1.3	Evaporation-Condensation Processes	8
1.3.2	Kinetic Effects	10
1.3.3	Mass-Dependent and Mass-Independent Isotope Effects	12
1.3.3.1	Mass Dependent Effects	12
1.3.3.2	Mass Independent Effects	13
1.3.4	Nuclear Volume and Magnetic Isotope Effects	14
1.3.4.1	Nuclear Volume Effects	14
1.3.4.2	Magnetic Isotope Effects	14
1.3.5	Multiply Substituted Isotopologues	14
1.3.5.1	Position or Site-Specific Isotope Fractionations	17
1.3.6	Diffusion	18
1.3.7	Other Factors Influencing Isotopic Fractionations	20
1.3.8	Isotope Geothermometers	22
1.4	Basic Principles of Mass Spectrometry	27
1.4.1	Continuous Flow—Isotope Ratio Monitoring Mass Spectrometers	30
1.4.2	General Remarks on Sample Preparation Methods for Gases	31
1.4.3	Cavity Ring Down Spectroscopy (CRDS)	33
1.5	Standards	33
1.6	Microanalytical Techniques	36
1.6.1	Laser Microprobe	36
1.6.2	Secondary Ion Mass Spectrometry (SIMS)	37

1.6.3	Multicollector-ICP-Mass Spectrometry . . . . .	38
1.6.4	High-Mass-Resolution Multiple-Collector IR Mass Spectrometer . . . . .	39
1.7	Isotope Variations of Metal Elements . . . . .	39
1.7.1	Medical Applications. . . . .	40
	References. . . . .	42
<b>2</b>	<b>Isotope Fractionation Processes of Selected Elements. . . . .</b>	<b>53</b>
2.1	Part 1: “Traditional Isotopes” (CHONS). . . . .	53
2.1.1	Hydrogen . . . . .	54
2.1.1.1	Methods . . . . .	54
2.1.1.2	Standards. . . . .	56
2.1.1.3	Fractionation Processes . . . . .	56
2.1.2	Carbon . . . . .	61
2.1.2.1	Analytical Methods . . . . .	61
2.1.2.2	Fractionation Processes . . . . .	62
2.1.3	Nitrogen . . . . .	66
2.1.3.1	Analytical Methods . . . . .	67
2.1.3.2	Biological Nitrogen Isotope Fractionations . . . . .	67
2.1.3.3	Nitrogen Isotope Distribution in the Earth. . . . .	69
2.1.3.4	Nitrogen in the Ocean. . . . .	70
2.1.3.5	Anthropogenic Nitrogen Sources. . . . .	71
2.1.4	Oxygen . . . . .	72
2.1.4.1	Analytical Methods . . . . .	72
2.1.4.2	Standards. . . . .	75
2.1.4.3	Fractionation Processes . . . . .	76
2.1.4.4	Triple Oxygen Isotope Compositions . . . . .	80
2.1.4.5	Fluid-Rock Interactions. . . . .	81
2.1.5	Sulfur . . . . .	84
2.1.5.1	Methods . . . . .	85
2.1.5.2	Fractionation Mechanisms. . . . .	85
2.1.5.3	Quadruple Sulfur Isotopes. . . . .	90
2.2	Part 2: “Non-traditional” Isotopes. . . . .	92
2.2.1	Lithium . . . . .	92
2.2.1.1	Methods . . . . .	93
2.2.1.2	Diffusion . . . . .	93
2.2.1.3	Magmatic Rocks . . . . .	93
2.2.1.4	Weathering . . . . .	95
2.2.1.5	Ocean Water . . . . .	95
2.2.1.6	Meteoritic Water . . . . .	96
2.2.2	Boron . . . . .	96
2.2.2.1	Methods . . . . .	97
2.2.2.2	Isotope Fractionation Mechanism . . . . .	98



	2.2.2.3	Fractionations at High Temperatures . . . . .	99
	2.2.2.4	Weathering Environment . . . . .	100
	2.2.2.5	Tourmaline . . . . .	101
2.2.3		Magnesium . . . . .	102
	2.2.3.1	High-Temperature Fractionations . . . . .	102
	2.2.3.2	Fractionations During Weathering . . . . .	104
	2.2.3.3	Ocean Water . . . . .	105
	2.2.3.4	Carbonates . . . . .	105
	2.2.3.5	Plants and Animals . . . . .	106
2.2.4		Calcium . . . . .	107
	2.2.4.1	Analytical Techniques . . . . .	107
	2.2.4.2	High Temperature Fractionations . . . . .	108
	2.2.4.3	Weathering . . . . .	109
	2.2.4.4	Fractionations During Carbonate Precipitation . . . . .	109
	2.2.4.5	Variations with Geologic Time . . . . .	110
	2.2.4.6	Ca in Plants, Animals and Humans . . . . .	111
2.2.5		Strontium . . . . .	112
	2.2.5.1	Silicates . . . . .	112
	2.2.5.2	Carbonates and Sulfates . . . . .	113
	2.2.5.3	Fluids and Plants . . . . .	114
2.2.6		Barium . . . . .	114
	2.2.6.1	Ocean . . . . .	115
2.2.7		Silicon . . . . .	115
	2.2.7.1	High-Temperature Fractionations . . . . .	116
	2.2.7.2	Chemical Weathering and Mineral Precipitation . . . . .	117
	2.2.7.3	Fractionations in Ocean Water . . . . .	118
	2.2.7.4	Cherts . . . . .	119
	2.2.7.5	Plants . . . . .	119
2.2.8		Chlorine . . . . .	120
	2.2.8.1	Methods . . . . .	120
	2.2.8.2	Hydrosphere . . . . .	121
	2.2.8.3	Mantle-Derived Rocks . . . . .	122
	2.2.8.4	Applications in the Environment . . . . .	122
2.2.9		Bromine . . . . .	123
2.2.10		Potassium . . . . .	124
2.2.11		Titanium . . . . .	125
2.2.12		Vanadium . . . . .	125
2.2.13		Chromium . . . . .	126
	2.2.13.1	Mantle Rocks . . . . .	127
	2.2.13.2	Low-Temperature Fractionations . . . . .	128
	2.2.13.3	Anthropogenic Cr in the Environment . . . . .	129

2.2.14	Iron . . . . .	129
	2.2.14.1 Analytical Methods . . . . .	130
	2.2.14.2 Isotope Equilibrium Studies . . . . .	131
	2.2.14.3 Meteorites . . . . .	132
	2.2.14.4 Igneous Rocks. . . . .	132
	2.2.14.5 Sediments . . . . .	133
	2.2.14.6 Ocean and River Water. . . . .	135
	2.2.14.7 Plants . . . . .	136
2.2.15	Nickel . . . . .	136
	2.2.15.1 Mantle Rocks and Meteorites . . . . .	137
	2.2.15.2 Water . . . . .	138
	2.2.15.3 Plants . . . . .	138
2.2.16	Copper . . . . .	138
	2.2.16.1 Low-Temperature Fractionations . . . . .	139
	2.2.16.2 Magmatic Rocks . . . . .	140
	2.2.16.3 Ore Deposits . . . . .	140
	2.2.16.4 River and Ocean Water. . . . .	141
	2.2.16.5 Plants . . . . .	141
2.2.17	Zinc. . . . .	142
	2.2.17.1 Fractionations During Evaporation . . . . .	143
	2.2.17.2 Variations in Mantle Derived Rocks . . . . .	143
	2.2.17.3 Ore Deposits . . . . .	143
	2.2.17.4 Variations in the Ocean. . . . .	144
	2.2.17.5 Anthropogenic Contamination. . . . .	144
	2.2.17.6 Plants and Animals . . . . .	145
2.2.18	Gallium . . . . .	145
	2.2.18.1 Germanium . . . . .	146
	2.2.18.2 Ore Deposits . . . . .	147
	2.2.18.3 Hydrosphere . . . . .	147
2.2.19	Selenium . . . . .	148
	2.2.19.1 Fractionation Processes . . . . .	148
	2.2.19.2 Natural Variations . . . . .	149
	2.2.19.3 Ocean . . . . .	149
2.2.20	Tellurium . . . . .	150
2.2.21	Molybdenum . . . . .	151
	2.2.21.1 Magmatic Rocks . . . . .	151
	2.2.21.2 Molybdenites. . . . .	153
	2.2.21.3 Sediments . . . . .	153
	2.2.21.4 Palaeoredox Proxy . . . . .	154
	2.2.21.5 Carbonates . . . . .	155
2.2.22	Silver. . . . .	155
2.2.23	Cadmium. . . . .	156
	2.2.23.1 Extraterrestrial Materials . . . . .	157
	2.2.23.2 Marine Environment . . . . .	157
	2.2.23.3 Pollution Indicator. . . . .	158

2.2.24	Tin . . . . .	158
2.2.25	Antimony . . . . .	159
2.2.26	Cerium . . . . .	160
2.2.27	Rhenium . . . . .	160
2.2.28	Tungsten . . . . .	161
2.2.29	Palladium . . . . .	162
2.2.30	Platinum . . . . .	162
2.2.31	Ruthenium. . . . .	163
2.2.32	Iridium . . . . .	164
2.2.33	Osmium. . . . .	164
2.2.34	Mercury. . . . .	164
2.2.34.1	MDF and MIF Fractionation Processes . . . . .	165
2.2.34.2	Variations in Rocks. . . . .	166
2.2.34.3	Environmental Pollutant . . . . .	167
2.2.35	Thallium . . . . .	168
2.2.35.1	Igneous Rocks. . . . .	169
2.2.35.2	Fractionations in the Ocean. . . . .	170
2.2.36	Uranium . . . . .	170
2.2.36.1	Fractionation Processes . . . . .	171
2.2.36.2	Mantle-Derived Rocks. . . . .	172
2.2.36.3	Ore Deposits . . . . .	172
2.2.36.4	Rivers and the Ocean . . . . .	172
2.2.36.5	Paleo-Redox Proxy . . . . .	173
	References. . . . .	174
<b>3</b>	<b>Variations of Stable Isotope Ratios in Nature . . . . .</b>	<b>229</b>
3.1	Extraterrestrial Materials. . . . .	229
3.1.1	Chondrites. . . . .	230
3.1.1.1	Oxygen . . . . .	230
3.1.1.2	Hydrogen . . . . .	232
3.1.1.3	Carbon . . . . .	233
3.1.1.4	Nitrogen . . . . .	234
3.1.1.5	Sulfur . . . . .	234
3.1.1.6	Metals . . . . .	235
3.1.2	The Moon. . . . .	236
3.1.2.1	Oxygen . . . . .	236
3.1.2.2	Hydrogen . . . . .	237
3.1.3	Mars . . . . .	238
3.1.3.1	Oxygen . . . . .	238
3.1.3.2	Hydrogen . . . . .	238
3.1.3.3	Carbon . . . . .	239
3.1.3.4	Sulfur . . . . .	240
3.1.4	Venus . . . . .	240

3.2	The Isotopic Composition of the Earth's Upper Mantle . . . . .	241
3.2.1	Oxygen . . . . .	242
3.2.2	Hydrogen . . . . .	243
3.2.3	Carbon . . . . .	245
3.2.4	Nitrogen . . . . .	246
3.2.5	Sulfur . . . . .	248
3.2.6	Magnesium and Iron . . . . .	249
3.2.7	Lithium and Boron . . . . .	249
3.2.8	Stable Isotope Composition of the Core . . . . .	250
3.3	Magmatic Rocks . . . . .	251
3.3.1	Fractional Crystallization . . . . .	251
3.3.2	Differences Between Volcanic and Plutonic Rocks . . . . .	252
3.3.3	Low Temperature Alteration Processes . . . . .	252
3.3.4	Assimilation of Crustal Rocks . . . . .	253
3.3.5	Glasses from Different Tectonic Settings . . . . .	253
3.3.5.1	Oxygen . . . . .	253
3.3.5.2	Hydrogen . . . . .	255
3.3.5.3	Carbon . . . . .	255
3.3.5.4	Nitrogen . . . . .	256
3.3.5.5	Sulfur . . . . .	256
3.3.6	Ocean Water/Basaltic Crust Interactions . . . . .	257
3.3.7	Granitic Rocks . . . . .	258
3.3.7.1	Zircon . . . . .	259
3.3.8	Volatiles in Magmatic Systems . . . . .	259
3.3.8.1	Water . . . . .	261
3.3.8.2	Carbon . . . . .	262
3.3.8.3	Nitrogen . . . . .	263
3.3.8.4	Sulfur . . . . .	263
3.3.9	Isotope Thermometers in Geothermal Systems . . . . .	264
3.4	Metamorphic Rocks . . . . .	265
3.4.1	Contact Metamorphism . . . . .	267
3.4.2	Regional Metamorphism . . . . .	268
3.4.3	Lower Crustal Rocks . . . . .	270
3.4.4	Thermometry . . . . .	270
3.5	Ore Deposits and Hydrothermal Systems . . . . .	272
3.5.1	Origin of Ore Fluids . . . . .	275
3.5.1.1	Magmatic Water . . . . .	276
3.5.1.2	Metamorphic Water . . . . .	277
3.5.1.3	Formation Waters . . . . .	277
3.5.2	Wall-Rock Alteration . . . . .	277
3.5.3	Fossil Hydrothermal Systems . . . . .	278
3.5.4	Hydrothermal Carbonates . . . . .	279

3.5.5	Sulfur Isotope Composition of Ore Deposits . . . . .	280
3.5.5.1	The Importance of $fO_2$ and pH . . . . .	280
3.5.5.2	Magmatic Ore Deposits . . . . .	282
3.5.5.3	Magmatic Hydrothermal Deposits . . . . .	282
3.5.5.4	Epithermal Deposits . . . . .	282
3.5.5.5	Recent and Fossil Sulfide Deposits at Mid-Ocean Ridges . . . . .	283
3.5.5.6	Mississippi-Valley-Type (MVT) Deposits . . . . .	284
3.5.5.7	Biogenic Deposits . . . . .	284
3.5.5.8	Metamorphosed Deposits . . . . .	285
3.5.6	Metal Isotopes . . . . .	285
3.6	Hydrosphere . . . . .	286
3.6.1	Meteoric Water—General Considerations . . . . .	286
3.6.1.1	$\delta D$ – $\delta^{18}O$ Relationship, Deuterium (D)–Excess . . . . .	289
3.6.1.2	$\delta^{17}O$ – $\delta^{18}O$ Relationships, $^{17}O$ Excess . . . . .	290
3.6.1.3	Meteoric Waters in the Past . . . . .	291
3.6.2	Ice Cores . . . . .	292
3.6.3	Groundwater . . . . .	293
3.6.4	Isotope Fractionations During Evaporation . . . . .	294
3.6.5	Ocean Water . . . . .	295
3.6.6	Pore Waters . . . . .	297
3.6.7	Formation Water . . . . .	298
3.6.8	Water in Hydrated Salt Minerals . . . . .	300
3.7	The Isotopic Composition of Dissolved and Particulate Compounds in Ocean and Fresh Waters . . . . .	301
3.7.1	Carbon Species in Water . . . . .	301
3.7.1.1	Bicarbonate in Ocean Water . . . . .	301
3.7.1.2	Particulate Organic Matter (POM) . . . . .	302
3.7.1.3	Carbon Isotope Composition of Pore Waters . . . . .	303
3.7.1.4	Carbon in Fresh Waters . . . . .	304
3.7.2	Silicon . . . . .	305
3.7.3	Nitrogen . . . . .	305
3.7.4	Oxygen . . . . .	306
3.7.5	Sulfate . . . . .	306
3.7.6	Phosphate . . . . .	308
3.7.7	Metal Isotopes . . . . .	309
3.8	Isotopic Composition of the Ocean During Geologic History . . . . .	310
3.8.1	Oxygen . . . . .	311
3.8.2	Carbon . . . . .	313
3.8.3	Sulfur . . . . .	315
3.8.4	Lithium . . . . .	317

3.8.5	Boron . . . . .	317
3.8.6	Calcium. . . . .	317
3.9	Atmosphere . . . . .	318
3.9.1	Atmospheric Water Vapour. . . . .	319
3.9.2	Nitrogen . . . . .	320
3.9.2.1	Nitrous Oxide . . . . .	320
3.9.3	Oxygen . . . . .	321
3.9.3.1	Evolution of Atmospheric Oxygen . . . . .	322
3.9.4	Carbon Dioxide. . . . .	324
3.9.4.1	Carbon . . . . .	324
3.9.4.2	Oxygen . . . . .	325
3.9.4.3	Long Term Variations in the CO <sub>2</sub> Concentration and Isotope Composition . . . . .	327
3.9.5	Carbon Monoxide . . . . .	329
3.9.6	Methane . . . . .	330
3.9.7	Hydrogen . . . . .	331
3.9.8	Sulfur . . . . .	332
3.9.9	Perchlorate . . . . .	333
3.9.10	Metal Isotopes. . . . .	334
3.10	Biosphere . . . . .	334
3.10.1	Living Organic Matter. . . . .	334
3.10.1.1	Bulk Carbon . . . . .	334
3.10.1.2	Position Specific Isotope Composition . . . . .	336
3.10.1.3	Hydrogen . . . . .	337
3.10.1.4	Oxygen . . . . .	338
3.10.1.5	Nitrogen . . . . .	339
3.10.1.6	Sulfur . . . . .	339
3.10.1.7	Metals . . . . .	340
3.10.2	Indicators of Diet and Metabolism . . . . .	340
3.10.3	Tracing Anthropogenic Organic Contaminant Sources . . . . .	341
3.10.4	Marine Versus Terrestrial Organic Matter . . . . .	342
3.10.5	Fossil Organic Matter . . . . .	343
3.10.6	Oil. . . . .	344
3.10.7	Coal . . . . .	346
3.10.7.1	Black Carbon . . . . .	347
3.10.8	Natural Gas. . . . .	347
3.10.8.1	Biogenic Gas. . . . .	348
3.10.8.2	Thermogenic Gas . . . . .	349
3.10.8.3	Abiogenic Methane . . . . .	349
3.10.8.4	Isotope Clumping in Methane. . . . .	350
3.10.8.5	Nitrogen in Natural Gas . . . . .	351
3.10.8.6	Isotope Signatures of Early Life on Earth . . . . .	351

3.11	Sedimentary Rocks . . . . .	351
3.11.1	Clay Minerals . . . . .	352
3.11.2	Clastic Sedimentary Rocks . . . . .	353
3.11.2.1	Weathering and Metal Isotopes . . . . .	355
3.11.3	Biogenic Silica and Cherts . . . . .	356
3.11.3.1	Biogenic Silica . . . . .	356
3.11.3.2	Cherts . . . . .	357
3.11.4	Marine Carbonates . . . . .	357
3.11.4.1	Oxygen . . . . .	357
3.11.4.2	Carbon . . . . .	362
3.11.5	Diagenesis . . . . .	363
3.11.5.1	Burial Pathway . . . . .	363
3.11.5.2	Meteoric Pathway . . . . .	364
3.11.6	Limestones . . . . .	364
3.11.7	Dolomites . . . . .	365
3.11.8	Freshwater Carbonates . . . . .	367
3.11.9	Phosphates . . . . .	367
3.11.10	Iron Oxides . . . . .	369
3.11.10.1	Oxygen . . . . .	369
3.11.10.2	Iron . . . . .	369
3.11.11	Sedimentary Sulfur and Pyrite . . . . .	370
3.11.11.1	Sulfur . . . . .	370
3.11.11.2	Pyrite . . . . .	371
3.12	Palaeoclimatology . . . . .	372
3.12.1	Continental Records . . . . .	373
3.12.1.1	Tree Rings . . . . .	373
3.12.1.2	Organic Matter . . . . .	373
3.12.1.3	Hydroxyl-Bearing Minerals . . . . .	374
3.12.1.4	Lake Sediments . . . . .	374
3.12.1.5	Speleothems . . . . .	375
3.12.1.6	Phosphates . . . . .	375
3.12.2	Ice Cores . . . . .	376
3.12.2.1	Correlations of Ice-Core Records . . . . .	377
3.12.2.2	Gas-Inclusions in Ice Cores . . . . .	378
3.12.3	Marine Records . . . . .	379
3.12.3.1	Corals . . . . .	380
3.12.3.2	Conodonts . . . . .	381
3.12.3.3	Characteristic Climatic Events . . . . .	381
	References . . . . .	383
	<b>Index</b> . . . . .	<b>433</b>

---

## List of Figures

Fig. 1.1	Plot of number of protons (Z) and number of neutrons (N) in stable ( <i>filled circles</i> ) and unstable ( <i>open circles</i> ) nuclides. . . .	2
Fig. 1.2	Number of stable isotopes of elements with even and odd number of protons (radioactive isotopes with half-lives greater than $10^9$ years are included) . . . . .	3
Fig. 1.3	Schematic potential energy <i>curve</i> for the interaction of two atoms in a stable molecule or between two molecules in a liquid or solid (after Bigeleisen 1965) . . . . .	5
Fig. 1.4	$\delta^{18}\text{O}$ in a cloud vapor and condensate plotted as a function of a fraction of remaining vapour in a cloud for a Rayleigh process. The temperature of the cloud is shown on the lower axis. The increase in fractionation with decreasing temperature is taken into account (after Dansgaard 1964) . . . . .	11
Fig. 1.5	Empirical calibrations of the clumped isotope thermometer (after Wacker et al. 2014). . . . .	16
Fig. 1.6	Arrhenius plot of diffusion coefficients versus reciprocal temperatures for various minerals. Data from phases reacted under <i>wet conditions</i> are given as <i>solid lines</i> , whereas <i>dry conditions</i> are represented by <i>dashed lines</i> . Note that the rates for dry systems are generally lower and have higher activation energies (steeper slopes) (after Cole and Chakraborty 2011) . . .	19
Fig. 1.7	$\text{CO}_2$ -graphite partial exchange experiments in a Northrop and Clayton plot at 700, 800, 1000 and 1200 °C. The connecting line in experiment at 1200 °C has a plain slope and defines the intercept more precisely than the experiment at 700 °C (after Scheele and Hoefs 1992). . . . .	26
Fig. 1.8	Schematic representation of the three-isotope exchange method. Natural samples plotted on the primary mass fractionation line (PF). Initial isotopic composition are mineral ( $M_0$ ) and water ( $W_0$ ) which is well removed from equilibrium with $M_0$ in $\delta^{17}\text{O}$ , but very close to equilibrium with $M_0$ in $\delta^{18}\text{O}$ . Complete isotopic equilibrium is defined by a secondary	



	mass fractionation line (SF) parallel to PF and passing through the bulk isotopic composition of the mineral plus water system. Isotopic composition of partially equilibrated samples $M_f$ and $W_f$ and completely equilibrated samples are $M_e$ and $W_e$ . Values for $M_e$ and $W_e$ can be determined by extrapolation from the measured values $M_0$ , $M_f$ , $W_0$ and $W_f$ (after Matthews et al. 1983) (Fig. 1.7, 6th edition, p. 23) . . . . .	27
Fig. 1.9	Schematic representation of a gas-source mass spectrometer for stable isotope measurements during the 1960s and 70s. P denotes pumping system, V denotes a variable volume. . . . .	28
Fig. 1.10	Schematic diagram of an elemental analyser-isotope ratio-mass spectrometer for the determination of carbon and nitrogen isotopes . . . . .	31
Fig. 1.11	Relationship between $^{18}\text{O}$ ( $^{16}\text{O}$ ) content in per cent and $\delta^{18}\text{O}$ in per mill. . . . .	34
Fig. 1.12	Precision of various oxygen isotope methods as a function of sample weight or size (from Bindeman 2008) . . . . .	37
Fig. 2.1	$\delta\text{D}$ variation ranges of geologically important reservoirs . . . . .	55
Fig. 2.2	$\delta\text{D}$ -values versus time for two beakers that have equal surface areas and equal volumes undergoing isotopic exchange in sealed systems. In both experiments at 21 and 52 °C isotope ratios progress toward an average value of $-56\%$ via exchange with ambient vapour: <i>solid curves</i> are calculated, <i>points</i> are experimental data (after Criss 1999) . . . . .	57
Fig. 2.3	Experimentally determined fractionation factors between liquid water and water vapour from 1 to 350 °C (after Horita and Wesolowski 1994). . . . .	57
Fig. 2.4	Global relationship between monthly means of $\delta\text{D}$ and $\delta^{18}\text{O}$ in precipitation, derived for all stations of the IAEA global network. <i>Line</i> indicates the global Meteoric Water Line (GMWL) (after Rozanski et al. 1993). . . . .	58
Fig. 2.5	D/H fractionations between $\text{H}_2\text{O}-\text{H}_2$ , $\text{H}_2\text{O}-\text{H}_2\text{S}$ and $\text{H}_2\text{O}-\text{CH}_4$ (from calculated data of Richet et al. 1977) . . . . .	59
Fig. 2.6	Carbon isotope fractionation between various geologic compounds and $\text{CO}_2$ (after Chacko et al. 2001) . . . . .	63
Fig. 2.7	Histogram of $\delta^{13}\text{C}$ values of $\text{C}_3$ and $\text{C}_4$ plants (after Cerling and Harris 1999). . . . .	64
Fig. 2.8	$\delta^{13}\text{C}$ -values of important geological reservoirs . . . . .	66
Fig. 2.9	$\delta^{15}\text{N}$ -values of important geological reservoirs . . . . .	70
Fig. 2.10	Oxygen isotope fractionation factors between liquid water and water vapour in the temperature range 0–350 °C (after Horita and Wesolowski 1994). . . . .	76
Fig. 2.11	Oxygen isotope fractionation between pure water and solutions of various ions (after O'Neil and Truesdell 1991) . . . . .	77

Fig. 2.12	Oxygen isotope fractionations between dissolved inorganic carbon (DIC) and water as function of pH and temperatures (after Beck et al. 2005) . . . . .	78
Fig. 2.13	Oxygen isotope fractionations between various minerals and calcite (after Chacko et al. 2001) . . . . .	80
Fig. 2.14	$\delta^{18}\text{O}_{(\text{feldspar})}$ versus $\delta^{18}\text{O}_{(\text{quartz})}$ and versus $\delta^{18}\text{O}_{(\text{pyroxene})}$ plots of disequilibrium mineral pair arrays in granitic and gabbroic rocks. The arrays indicate open-system conditions from circulation of hydrothermal meteoric fluids (after Gregory et al. 1989) . . . . .	83
Fig. 2.15	$\delta^{18}\text{O}$ values of important geological reservoirs . . . . .	83
Fig. 2.16	$\delta^{34}\text{S}$ -values of important geological reservoirs . . . . .	84
Fig. 2.17	Equilibrium fractionations among sulfur compounds relative to $\text{H}_2\text{S}$ ( <i>solid lines</i> experimentally determined, <i>dashed lines</i> extrapolated or theoretically calculated (after Ohmoto and Rye 1979) . . . . .	87
Fig. 2.18	Rayleigh plot for sulfur isotope fractionations during reduction of sulfate in a closed system. Assumed fractionation factor 1.025, assumed composition of initial sulfate: +10‰) . . . . .	89
Fig. 2.19	Compilation of $\Delta^{33}\text{S}$ versus age for rock samples. Note large $\Delta^{33}\text{S}$ before 2.45 Ga, indicated by <i>vertical line</i> , small but measurable $\Delta^{33}\text{S}$ after 2.45 Ga (Farquahar et al. 2007) . . . . .	91
Fig. 2.20	Lithium isotope variations in major geological reservoirs . . . . .	92
Fig. 2.21	Boron isotope variations in geologically important reservoirs . . . . .	97
Fig. 2.22	<b>a</b> Distribution of aqueous boron species versus pH; <b>b</b> $\delta^{11}\text{B}$ of the two dominant species $\text{B}(\text{OH})_3$ and $\text{B}(\text{OH})_4^-$ versus pH (after Hemming and Hanson 1992) . . . . .	99
Fig. 2.23	$\delta^{26}\text{Mg}$ values of important geological reservoirs . . . . .	103
Fig. 2.24	$\delta^{44/40}\text{Ca}$ -values of important geological reservoirs . . . . .	108
Fig. 2.25	$\delta^{88/86}\text{Sr}$ -values of important geological reservoirs . . . . .	112
Fig. 2.26	$\delta^{30}\text{Si}$ -values of important geological reservoirs . . . . .	116
Fig. 2.27	$\delta^{37}\text{Cl}$ values of important geological reservoirs . . . . .	121
Fig. 2.28	$\delta^{53}\text{Cr}$ -values of important geological reservoirs (ocean water: Scheiderich et al. (2015) observed large variations in oceanic surface waters). . . . .	127
Fig. 2.29	$\delta^{56}\text{Fe}$ -values of important geological reservoirs . . . . .	130
Fig. 2.30	$\delta^{60/58}\text{Ni}$ isotope variations in important geological reservoir . . . . .	137
Fig. 2.31	$\delta^{65}\text{Cu}$ -values of important geological reservoirs . . . . .	139
Fig. 2.32	$\delta^{66}\text{Zn}$ -values of important geological reservoirs . . . . .	142
Fig. 2.33	$\delta^{74/70}\text{Ge}$ isotope variations of geological reservoirs . . . . .	146
Fig. 2.34	$\delta^{82/76}\text{Se}$ -values of important geological reservoirs . . . . .	149
Fig. 2.35	$\delta^{98/95}\text{Mo}$ -values of important geological reservoirs . . . . .	152

Fig. 2.36	$\delta^{114/110}\text{Cd}$ -values of important geological reservoirs . . . . .	156
Fig. 2.37	$\delta^{202/198}\text{Hg}$ and $\Delta^{201}\text{Hg}$ values of important geological reservoirs . . . . .	167
Fig. 2.38	$\delta^{205}\text{Tl}$ -values of important geological reservoirs . . . . .	169
Fig. 2.39	$\delta^{238}\text{U}$ -values of important geological reservoirs . . . . .	171
Fig. 3.1	$^{17}\text{O}$ versus $^{18}\text{O}$ isotopic composition of Ca–Al rich inclusions (CAI) from chondrites (Clayton 1993) . . . . .	230
Fig. 3.2	Carbon compounds in primitive meteorites. Species classified as interstellar on the basis of C-isotopes are <i>coloured</i> . Only a minor fraction of organic carbon is interstellar (after Ming et al. 1989) . . . . .	233
Fig. 3.3	Three oxygen isotope plot of lunar, Martian rocks and HED meteorites supposed to be fragments of asteroid Vesta (after Wiechert et al. 2001) . . . . .	239
Fig. 3.4	Hydrogen isotope variations in mantle-derived minerals and rocks (modified after Bell and Ihinger 2000) . . . . .	244
Fig. 3.5	Carbon isotope variations of diamonds ( <i>arrows</i> indicate highest and lowest $\delta^{13}\text{C}$ -values (modified after Cartigny 2005) . . . . .	246
Fig. 3.6	Nitrogen isotope variations in mantle derived materials (modified after Marty and Zimmermann 1999) . . . . .	247
Fig. 3.7	Sulfur isotope compositions of high- and low-S peridotites . . . . .	248
Fig. 3.8	Plot of $\delta^{18}\text{O}$ -values versus Mg numbers for oceanic basalts ( <i>filled circles</i> ) and continental basalts ( <i>open circles</i> ). The <i>shaded field</i> denotes the $\pm 2\sigma$ range of a MORB mean value of +5.7‰. The <i>clear vertical field</i> denotes the range for primary basaltic partial melts in equilibrium with a peridotitic source (Harmon and Hoefs 1995) . . . . .	254
Fig. 3.9	Histogram of $\delta^{18}\text{O}$ -values for igneous zircons ( <b>a</b> <i>Archean</i> , <b>b</b> <i>Proterozoic</i> , <b>c</b> <i>Phanerozoic</i> ) (after Valley et al. 2005) . . . . .	260
Fig. 3.10	Isotopic composition of thermal waters and associated local ground waters. Lines connect corresponding thermal waters to local groundwaters (Giggenbach 1992) . . . . .	261
Fig. 3.11	S-isotope degassing scenarios at high and low pressures and at high and low oxygen fugacities (De Moor et al. 2013) . . . . .	264
Fig. 3.12	Coupled C–O trends showing decreasing values of $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ with increasing metamorphic grade from contact metamorphic localities (Baumgartner and Valley 2001) . . . . .	266
Fig. 3.13	Plot of $\delta^{18}\text{O}$ of quartz versus $\delta^{18}\text{O}$ magnetite ( <i>solid squares</i> ) and of biotite versus muscovite ( <i>open squares</i> ) from rocks whose peak metamorphic conditions range from greenschist through granulite facies (after Kohn 1999) . . . . .	271
Fig. 3.14	Frequency distribution of calcite-graphite fractionations ( $\Delta$ ) with increasing metamorphic grade (after Des Marais 2001) . . . . .	273

Fig. 3.15	Plot of $\delta\text{D}$ versus $\delta^{18}\text{O}$ of waters of different origin. . . . .	275
Fig. 3.16	C- and O-isotope compositions of calcites and siderites from the Bad Grund and Lautenthal deposits, Harz (after Zheng and Hoefs 1993). . . . .	280
Fig. 3.17	Influence of $f\text{O}_2$ and pH on the sulfur isotope composition of sphalerite and barite at 250 °C and $\delta^{34}\text{S}_{\Sigma\text{S}} = 0\text{‰}$ (modified after Ohmoto 1972) . . . . .	281
Fig. 3.18	Schematic O-isotope fractionation of water in the atmosphere (after Siegenthaler 1979). . . . .	287
Fig. 3.19	Average $\delta\text{D}$ -values of the annual precipitation from oceanic islands as a function of the amount of annual rainfall. The island stations are distant from continents, within 30° of the equator and at elevations less than 120 m (after Lawrence and White 1991) . . . . .	288
Fig. 3.20	Correlations of $\delta\text{D}$ and $\delta^{18}\text{O}$ values of Greenland (GISP-2) and Antarctic (Vostok) ice cores covering the last glacial-interglacial cycles ( <a href="http://www.gisp2.sr.unh.edu/GISP2/DATA/Bender.html">http://www.gisp2.sr.unh.edu/GISP2/DATA/Bender.html</a> ) . . . . .	293
Fig. 3.21	$\delta\text{D}$ versus $\delta^{18}\text{O}$ values of the Dead Sea and its water sources as an example of an evaporative environment (after GAT 1984). . . . .	294
Fig. 3.22	Salinity versus $\delta^{18}\text{O}$ relationships in modern ocean surface and deep waters (after Railsback et al. 1989). . . . .	296
Fig. 3.23	Comparison of measured and modeled $\delta^{18}\text{O}$ values of surface ocean waters. Characteristic features are: tropical maxima, equatorial low- and high-latitude minima, enrichment of the Atlantic relative to the Pacific (after Delaygue et al. 2000). . . . .	296
Fig. 3.24	$\delta\text{D}$ versus $\delta^{18}\text{O}$ values for formation waters from the midcontinental region of the United States (after Taylor 1974) . . . . .	299
Fig. 3.25	Vertical profiles of dissolved $\text{CO}_2$ , $\delta^{13}\text{C}$ , dissolved $\text{O}_2$ and $\delta^{18}\text{O}$ in the North Atlantic (Kroopnick et al. 1972). . . . .	302
Fig. 3.26	$\delta^{13}\text{C}$ records of total dissolved carbon from pore waters of anoxic sediments recovered in various DSDP sites (after Anderson and Arthur 1983) . . . . .	303
Fig. 3.27	Carbon isotopic composition of total dissolved carbon in large river systems. Data source: Amazon: Longinelli and Edmond (1983), Rhine: Buhl et al. (1991), St. Lawrence: Yang et al. (1996). . . . .	304
Fig. 3.28	Frequency distribution of $\delta^{34}\text{S}$ -values in river sulfate. . . . .	308
Fig. 3.29	$\delta^{18}\text{O}$ data of bulk rock calcite and brachiopods over time for <b>a</b> measured and <b>b</b> shifted values (upward shift of 2‰ for all bulk rock data (Jaffres et al. 2007)). . . . .	312

Fig. 3.30	$\delta^{13}\text{C}$ -values for marine carbonates over time. Note persistent values of 0–3‰ for the last 600 Ma, anomalous variability at 0.6–0.8 Ga and 2.0–2.3 Ga correlative with snowball earth episodes (Shields and Veizer 2002) . . . . .	314
Fig. 3.31	Marine sulfate $\delta^{34}\text{S}$ curve of marine barite for 130 Ma to present (Paytan et al. 2004) . . . . .	316
Fig. 3.32	$\delta^{17}\text{O}$ versus $\delta^{18}\text{O}$ plot of atmospheric oxygen species (Thiemens 2006). . . . .	319
Fig. 3.33	$\delta^{56}\text{Fe}$ values of pyrite and iron oxides versus time showing three evolutionary stages of the ocean (Anbar and Rouxel 2007). . . . .	323
Fig. 3.34	Relationship between atmospheric $\text{CO}_2$ concentration and $\delta^{13}\text{C}_{(\text{CO}_2)}$ (after Keeling 1958). . . . .	325
Fig. 3.35	Seasonal $\delta^{13}\text{C}$ variations of atmospheric $\text{CO}_2$ from five stations in the Northern Hemisphere. <i>Dots</i> denote monthly averages, <i>oscillating curves</i> are fits of daily averages (after Keeling et al. 1989). . . . .	326
Fig. 3.36	$\delta^{18}\text{O}$ seasonal record of atmospheric $\text{CO}_2$ from three stations: Point Barrow 71.3°N, Mauna Loa 19.5°S, South Pole 90.0°S (after Ciais et al. 1998). . . . .	327
Fig. 3.37	Law Dome ice core $\text{CO}_2$ and $\delta^{13}\text{C}$ record for the last 1000 years (after Trudinger et al. 1999) . . . . .	328
Fig. 3.38	S-isotope composition of <b>a</b> natural and <b>b</b> anthropogenic sulfur sources in the atmosphere. <i>DMS</i> Dimethylsulfide . . . . .	332
Fig. 3.39	Generalized scheme of hydrogen isotope changes in plants (Sachse et al. 2012) . . . . .	337
Fig. 3.40	Petroleum-type curves of different oil components from the North Sea showing a positive oil-oil correlation and a negative source rock—oil correlation ( <i>SAT</i> saturated hydrocarbons, <i>AROM</i> aromatic hydrocarbons, <i>NOS'S</i> heterocompounds, <i>ASPH</i> asphaltenes (Stahl 1977). . . . .	345
Fig. 3.41	$\delta^{13}\text{C}$ and $\delta\text{D}$ variations of natural gases of different origins (after Whiticar 1999) . . . . .	350
Fig. 3.42	$\delta\text{D}$ and $\delta^{18}\text{O}$ values of kaolinites and related minerals from weathering and hydrothermal environments. The meteoric water line, kaolinite weathering and supergene/hypogene (S/H) lines are given for reference (after Sheppard and Gilg 1996). . . . .	353
Fig. 3.43	Histogram of $\delta^{18}\text{O}$ -values of quartz in sandstone from 6–10 $\mu\text{m}$ spots by ion microprobe. Mixed analyses are on the boundary of detrital quartz and quartz overgrowth (Kelly et al. 2007) . . . . .	354

Fig. 3.44	Predicted ( <i>bars</i> ) and measured ( <i>crosses</i> ) oxygen isotope composition of separated minerals from Haitian weathering profiles. The range of predicted $\delta^{18}\text{O}$ -values are calculated assuming a temperature of 25 °C and a meteoric water $\delta^{18}\text{O}$ -value of $-3.1\text{‰}$ (after Bird et al. 1992) . . . . .	355
Fig. 3.45	$\Delta^{18}\text{O}$ and $\Delta^{13}\text{C}$ differences from equilibrium isotope composition of extant calcareous species (after Wefer and Berger 1991) . . . . .	359
Fig. 3.46	Latitudinal distribution of O-isotope composition of planktonic foraminifera and yearly averaged temperatures at sea surface and 250 m water depth (after Mulitza et al. 1997) . . . . .	360
Fig. 3.47	$\delta^{13}\text{C}$ -values of benthic foraminifera species. The $\delta^{13}\text{C}$ -value for the dissolved bicarbonate in deep equatorial water is shown by the vertical line (after Wefer and Berger 1991) . . . . .	362
Fig. 3.48	Carbon and oxygen isotope composition of some recent and Pleistocene dolomite occurrences (after Tucker and Wright 1990) . . . . .	366
Fig. 3.49	Carbon and oxygen isotope compositions of freshwater carbonates from recently closed lakes (after Talbot 1990) . . . . .	367
Fig. 3.50	Dansgaard–Oeschger events in the time period from 45,000 to 30,000 years before present from GRIP and NGRIP ice core data ( <a href="http://en.wikipedia.org/wiki/Image:Grip-ngrip-do18-closeup.png">http://en.wikipedia.org/wiki/Image:Grip-ngrip-do18-closeup.png</a> ) . . . . .	377
Fig. 3.51	Composite $\delta^{18}\text{O}$ fluctuation in the foraminifera species <i>G. saculifer</i> from Caribbean cores (Emiliani 1978) . . . . .	379
Fig. 3.52	Global deep-sea isotope record from numerous DSDP and ODP cores (Zachos et al. 2001) . . . . .	382

## List of Tables

Table 1.1	Types of atomic nuclei and their frequency of occurrence. . . . .	3
Table 1.2	Characteristic physical properties of $\text{H}_2^{16}\text{O}$ , $\text{D}_2^{16}\text{O}$ , and $\text{H}_2^{18}\text{O}$ . . . . .	4
Table 1.3	Comparison between $\delta$ , $\alpha$ , and $10^3 \ln \alpha_{\text{A-B}}$ . . . . .	9
Table 1.4	Stochastic abundances of $\text{CO}_2$ isotopologues (Eiler 2007). . . . .	15
Table 1.5	Differences between the offline and online techniques. . . . .	30
Table 1.6	Absolute isotope ratios of international standards (After Hayes 1983) . . . . .	34
Table 1.7	Worldwide standards in use for the isotopic composition of hydrogen, boron, carbon, nitrogen, oxygen, silicon, sulfur, chlorine and of selected metals (Möller et al. 2012) . . . . .	35
Table 1.8	Gases most commonly used in isotope ratio in mass spectrometry . . . . .	36
Table 2.1	Hydrogen isotope standards. . . . .	56
Table 2.2	$\delta^{13}\text{C}$ -values of NBS-reference samples relative to V-PDB. . . . .	62
Table 2.3	Nitrogen isotope fractionations for microbial cultures (after Casciotti 2009). . . . .	69
Table 2.4	Acid fractionation factors for various carbonates determined at 25 °C (modified after Kim et al. 2007) . . . . .	74
Table 2.5	$\delta^{18}\text{O}$ -values of commonly used O-isotope standards (data for sulfate and nitrate are from Brand et al. 2009a, b) . . . . .	75
Table 2.6	Experimentally determined oxygen isotope fractionation factors relative to water for the aqueous system $\text{CO}_2\text{--H}_2\text{O}$ between 5 and 40 °C according to $10^3 \ln \alpha = A(10^6/T^{-2}) + B$ (Beck et al. 2005) . . . . .	78
Table 2.7	Sequence of minerals in the order (bottom to top) of their increasing tendency to concentrate $^{18}\text{O}$ . . . . .	79
Table 2.8	Coefficients A for mineral—pair fractionations ( $1000 \ln \alpha_{\text{X-Y}} = A/T^2$ ) $10^6$ (after Chiba et al. 1989) . . . . .	80
Table 2.9	Equilibrium isotope fractionation factors of sulfides with respect to $\text{H}_2\text{S}$ . . . . .	86

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Table 3.1	Variations in the numerical constant and the deuterium excess for selected stations of the IAEA global network (Rozanski et al. 1993) . . . . .	289
Table 3.2	Experimentally determined fractionation factors of salt minerals and their corrections using “salt effect” coefficients (after Horita 1989) . . . . .	300
Table 3.3	$\delta^{13}\text{C}$ -values of separated individual hydrocarbons from the Messel shale (Freeman et al. 1990). . . . .	336