

1	Hydrogen and Alkali Metals: Elements of the First Main Group	1
1	Introduction	1
2	Occurrence	2
3	Production	2
4	Properties	3
5	Individual Presentations	3
	References	66
2	Alkaline Earth Metals: Elements of the Second Main Group	77
1	Introduction	77
2	Occurrence	78
3	Production	79
4	Properties	79
5	Individual Presentations	80
	References	132
3	Earth Metals: Elements of the Third Main Group	141
1	Introduction	141
2	Occurrence	142
3	Production	142
4	Properties	142
5	Individual Presentations	143
	References	204
4	Carbon Group: Elements of the Fourth Main Group	215
1	Introduction	215
2	Occurrence	216
3	Production	217
4	Properties	217
5	Individual Presentations	217
	References	271
5	Pnictogens: Elements of the Fifth Main Group	281
1	Introduction	281
2	Occurrence	282

3	Production	282
4	Properties.	283
5	Individual Presentations	283
	References	341
6	Chalcogens: Elements of the Sixth Main Group	351
1	Introduction	351
2	Occurrence.	352
3	Production	352
4	Properties.	353
5	Individual Presentations	353
	References	396
7	Halogens: Elements of the Seventh Main Group	403
1	Introduction	403
2	Occurrence.	404
3	Production	405
4	Properties.	405
5	Individual Presentations	405
	References	443
8	Noble Gases: Elements of the Eighth Main Group	449
1	Introduction	449
2	History and Occurrence.	451
3	Processing, Separation and Production	451
4	Properties.	452
5	Individual Presentations	453
	References	482
9	Titanium Group: Elements of the Fourth Subgroup	487
1	Introduction	487
2	Occurrence.	488
3	Production	488
4	Properties.	488
5	Individual Presentations	489
	References	528
10	Vanadium Group: Elements of the Fifth Subgroup	537
1	Introduction	537
2	Occurrence.	538
3	Production	538
4	Properties.	538
5	Individual Presentations	539
	References	574
11	Chromium Group: Elements of the Sixth Subgroup	581
1	Introduction	581
2	Occurrence.	582
3	Production	582
4	Properties.	582
5	Individual Presentations	583
	References	623

12	Manganese Group: Elements of the Seventh Subgroup	633
1	Introduction	633
2	Occurrence.	634
3	Production	635
4	Properties.	635
5	Individual Presentations	635
	References	669
13	Iron Group: Elements of the Eighth Subgroup	675
1	Introduction	675
2	Occurrence.	676
3	Production	677
4	Properties.	677
5	Individual Presentations	677
	References	710
14	Cobalt Group: Elements of the Ninth Subgroup	717
1	Introduction	718
2	Occurrence.	719
3	Production	719
4	Properties.	719
5	Individual Presentations	719
	References	749
15	Nickel Group: Elements of the Tenth Subgroup	757
1	Introduction	757
2	Occurrence.	759
3	Production	759
4	Properties.	759
5	Individual Presentations	759
	References	789
16	Copper Group: Elements of the First Subgroup	795
1	Introduction	795
2	Occurrence.	796
3	Production	797
4	Properties.	797
5	Individual Presentations	797
	References	831
17	Zinc Group: Elements of the Second Subgroup	837
1	Introduction	837
2	Occurrence.	838
3	Production	838
4	Properties.	839
5	Individual Presentations	839
	References	870
18	Rare Earth Metals: Lanthanides and Third Subgroup	875
1	Introduction	875
2	History, Occurrence and Production	876

3	Physical and Chemical Properties	881
4	Analytics	882
5	World Market.	883
6	Individual Metals of the Third Subgroup (Scandium, Yttrium, Lanthanum, Actinium) and the Group of Rare Earth Metals (Cerium to lutetium)	884
	References	982
19	Radioactive Elements: Actinides	999
1	Introduction	999
2	Actinides—History and Occurrence	1000
3	Processing, Separation, and Production	1001
4	Actinides—Physical and Chemical Properties, Analytics. . .	1001
5	Individual Actinide Metals (thorium to lawrencium)	1002
	References	1084
20	Outlook: Chemical Elements of the 8th and 9th Period	1105
1	What's Next in the Periodic Table?	1105
	References	1117
21	Drive Batteries and Accumulators for Motor Vehicles	1121
	References	1123
22	Fuel Cells	1125
	References	1129
23	Semiconductors	1131
	References	1136