

CONTENTS

Introduction	vi
Acknowledgments.....	viii

Teaching Strategies

Using Cooperative Learning to Teach Mineralogy (and Other Courses, Too!) <i>LeeAnn Srogi & Lynda Baloché</i>	1
Physical Properties of Minerals and Determinative Techniques, An Introduction to Cooperative Learning <i>Ken Bladh</i>	27
Mineral Classification—What's in a Name? <i>David W. Mogk</i>	37
A Term-Long Mineralogy Lab Practical Exam <i>Kurt Hollocher</i>	43
Field Notes <i>David W. Mogk</i>	47

Accessing Mineralogical Information

Exercises with Mineral Names, Literature and History <i>Francis Ö. Dudás</i>	53
Short Readings from the <i>American Mineralogist</i> : Sneaky Tools for Teaching Scientific Reading Comprehension and Mineralogical Concepts <i>Kurt Hollocher</i>	57
Wondering, Wandering and Winnowing: The WWW and Mineralogy <i>Philip E. Brown</i>	61

Experimental Mineralogy

Crystal Growth Fast and Slow <i>Peter J. Heaney</i>	67
Growing Crystals on a Microscope Stage <i>Paul Sorensen & Dexter Perkins</i>	79
Mineral Synthesis and X-ray Diffraction Experiments <i>Dexter Perkins & Paul Sorensen</i>	81
Making Solid Solutions with Alkali Halides (and Breaking Them) <i>John B. Brady</i>	91

Phase Fun with Feldspars: Simple Experiments to Change the Chemical Composition, State of Order, and Crystal System <i>Guy L. Hovis</i>	97
Determination of Chemical Composition, State of Order, Molar Volume, and Density of a Monoclinic Alkali Feldspar using X-ray Diffraction <i>Guy L. Hovis</i>	107
Exercises in the Geochemical Kinetics of Mineral-Water Reactions: The Rate Law and Rate-Determining Step in the Dissolution of Halite <i>Michael A. Velbel</i>	119
Heat Capacity of Minerals: A Hands-on Introduction to Chemical Thermodynamics <i>David G. Bailey</i>	131
Phase Diagrams in Vivo <i>Erich U. Petersen</i>	147
Experiments on Simple Binary Mineral Systems <i>John D. Winter</i>	159
Crystallography	
Computer Generated Crystals with <i>SHAPE</i> <i>Kenneth J. Brock</i>	163
Miller Indices and Symmetry Content: A Demonstration Using <i>SHAPE</i> , A Computer Program for Drawing Crystals <i>Michael A. Velbel</i>	175
Crystal Measurement and Axial Ratio Laboratory <i>George R. McCormick</i>	187
The Use of Natural Crystals in the Study of Crystallography <i>Roger T. Steinberg</i>	197
The Metrical Matrix in Teaching Mineralogy <i>Gerald V. Gibbs</i>	201
From 2D to 3D: I. Escher Drawings, Crystallography, Crystal Chemistry, and Crystal "Defects" <i>Peter R. Buseck</i>	213
From 2D to 3D: II. TEM and AFM Images <i>Peter R. Buseck</i>	229
A Fun and Effective Exercise for Understanding Lattices and Space Groups <i>Dexter Perkins</i>	245
Construction of Crystal Models and Their Graphic Equivalents <i>Francis Ö. Dudás</i>	251

Building Crystal Structure Ball Models Using Pre-drilled Templates: Sheet Structures, Tridymite, and Cristobalite <i>Kurt Hollocher</i>	255
---	-----

Directed-Discovery of Crystal Structures Using Ball and Stick Models <i>David W. Mogk</i>	283
--	-----

Optical Mineralogy

Minerals and Light <i>Edward F. Stoddard</i>	291
---	-----

Experiments in Crystal Optics <i>Hans Dieter Zimmermann</i>	297
--	-----

Laboratory Exercises and Demonstration with the Spindle Stage <i>Mickey E. Gunter</i>	309
--	-----

Crystal Chemistry

Introduction to the SEM/EDS or "Every composition Tells a Story" <i>John T. Cheney & Peter D. Crowley</i>	319
--	-----

Color in Minerals <i>M. Darby Dyar</i>	323
---	-----

Minerals, Geology and Society

Better Living through Minerals: X-ray Diffraction of Household Products <i>Barb Dutrow</i>	349
---	-----

Asbestos: Mineralogy, Health Hazards and Public Policy <i>Helen M. Lang & Sid P. Halsor</i>	361
--	-----

Introduction to the Properties of Clay Minerals <i>Stephen Guggenheim</i>	371
--	-----

Mineral Separation and Provenance Lab Exercise <i>Mary Roden-Tice</i>	389
--	-----

Selected References for Teachers of Mineralogy	397
--	-----