

INDEX, VOLUME 74, 1989

- Abbott, R.N., Jr., C.W. Burnham, J.E. Post:  
Hydrogen in humite-group minerals: Structure-energy calculations, 1300
- Abbott, R.N., Jr., J.E. Post, C.W. Burnham:  
Treatment of the hydroxyl in structure-energy determinations, 141
- Agel, A., see Petrov, I., 1130
- Ahn, J.H., P.R. Buseck: Microstructures and tetrahedral strip-width order and disorder in Fe-rich minnesotaite, 384
- Akizuki, M.: Growth structure and crystal symmetry of grossular garnets from the Jeffrey mine, Asbestos, Quebec, Canada, 859
- Akizuki, M., H. Nishido, M. Fujimoto:  
Herschelite: Morphology and growth sectors, 1337
- Alexander, V.D.: Iron distribution in staurolite at room and low temperatures, 610
- Angel, R.J., L.W. Finger, R.M. Hazen, M. Kan-zaki, D.J. Weidner, R.C. Liebermann, D.R. Veblen: Structure and twinning of single-crystal MgSiO<sub>3</sub> garnet synthesized at 17 GPa and 1800 °C, 509
- Angel, R.J., T. Gasparik, L.W. Finger: Crystal structure of a Cr<sup>2+</sup>-bearing pyroxene, 599
- Angel, R.J., see McCormick, T.C., 1287
- Antonini, R., see Isotani, S., 432
- Armbruster, T., see Lager, G.A., 840
- Ashley, P.M., see Eggleton, R.A., 1360
- Bailey, S.W., see Guggenheim, S., 637
- Banerjee, H., see Dasgupta, S., 200
- Banfield, J.F., P. Karabinos, D.R. Veblen:  
Transmission electron microscopy of chloritoid: Intergrowth with sheet silicates and reactions in metapelites, 549
- Bartelmehs, K.L., G.V. Gibbs, M.B. Boisen, Jr.: Bond-length and bonded-radii variations in sulfide molecules and crystals containing main-group elements: A comparison with oxides, 620
- Bartholomew, P.R.: Interpretation of the solution properties of Fe-Mg olivines and aqueous Fe-Mg chlorides from ion-exchange experiments, 37
- Bayliss, P.: Crystal chemistry and crystallography of some minerals within the pyrite group, 1168
- Bell, P.M., see Hofmeister, A.M., 281
- Beneke, K., G. Lagaly: A hydrated potassium layer silicate and its crystalline silicic acid, 224
- Benkerrou, C., M. Fontelles: Vanadian garnets in calcareous metapelites and skarns at Coat-an-Noz, Belle-Isle-en-Terre (Cotes du Nord), France, 852
- Beran, A., G.R. Rossman, E.S. Grew: The hydrous component of sillimanite, 812
- Berman, R.G., see Brown, T.H., 485
- Bernstein, L.R., D.G. Reichel, S. Merlino:  
Renierite crystal structure refined from Rietveld analysis of powder neutron-diffraction data, 1177, 1412 [erratum]
- Bershov, L.V., see Petrov, I., 604
- Bhattacharya, P.K., see Dasgupta, S., 200
- Bianchi, R., see Graeser, S., 676
- Bideaux, R.A., see Dunn, P.J., 934
- Birch, W.D., see Pring, A., 1377
- Bish, D.L., J.E. Post: Thermal behavior of complex, tunnel-structure manganese oxides, 177
- Bish, D.L., see Post, J.E., 913
- Boettcher, S.L., Q. Guo, A. Montana: A simple device for loading gases in high-pressure experiments, 1383
- Boggs, R.C., see Ghose, S., 1084
- Boisen, M.B., Jr., see Bartelmehs, K.L., 620
- Bol, L.C., A. Bos, P.C.C. Sauter, J.B.H. Jansen:  
Barium-titanium - rich phlogopites in marbles from Rogaland, southwest Norway, 439
- Bons, A.-J., D. Schryvers: High-resolution electron microscopy of stacking irregularities in chlorites from the central Pyrenees, 1113
- Bos, A., see Bol, L.C., 439
- Brearley, M., see Montana, A., 1
- Brearley, M., see White, B.S., 513
- Brown, G.E., Jr., see Hochella, M.F., Jr., 1233
- Brown, N.E., A. Navrotsky: Structural, thermodynamic, and kinetic aspects of disordering in the pseudobrookite-type compound karronite, MgTi<sub>2</sub>O<sub>5</sub>, 902
- Brown, P.E.: FLINCOR: A microcomputer program for the reduction and investigation of fluid-inclusion data, 1390
- Brown, T.H., R.G. Berman, E.H. Perkins: PTA-SYSTEM: A GeO-Calc software package for the calculation and display of activity-temperature-pressure phase diagrams, 485
- Browne, P.R.L., S.F. Courtney, C.P. Wood: Formation rates of calc-silicate minerals deposited inside drillhole casing, Ngatamariki geothermal field, New Zealand, 759
- Bryndzia, L.T., A.M. Davis: Liquidus phase relations on the quasi-binary join Cu<sub>2</sub>S-Sb<sub>2</sub>S<sub>3</sub>: Implications for the formation of tetrahedrite and skinnerite, 236
- Bryndzia, L.T., O.J. Kleppa: Standard molar enthalpies of formation of sulfosalts in the Ag-As-S system and thermochemistry of the sulfosalts of Ag with As, Sb, and Bi, 243
- Buchwald, V.F., R.S. Clarke, Jr.: Corrosion of Fe-Ni alloys by Cl-containing akaganeite (beta-FeOOH): The Antarctic meteorite case, 656
- Burke, E.A.J., see Jambor, J.L., 1399
- Burnham, C.W., see Abbott, R.N., Jr., 141
- Burnham, C.W., see Abbott, R.N., Jr., 1300
- Burt, D.M.: Vector representation of tourmaline compositions, 826

- Buseck, P.R., see Ahn, J.H., 384  
 Buseck, P.R., see de Villiers, J.P., 1325  
 Buseck, P.R., see Hassan, I., 394
- Cameron, M.: Report of the Secretary for 1988, 1413  
 Cameron, M., see Hughes, J.M., 870  
 Capobianco, C., M. Carpenter: Thermally induced changes in kalsilite (KAlSiO<sub>4</sub>), 797  
 Carlson, W.D.: Subsolidus phase equilibria near the enstatite-diopside join in CaO-MgO-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> at atmospheric pressure, 325  
 Carmichael, I.S.: Presentation of the Mineralogical Society of America Award for 1988 to Raymond Jeanloz, 719  
 Carpenter, M.A.: Review of Feldspar Minerals, by J.V. Smith and W.L. Brown, 507  
 Carpenter, M., see Capobianco, C., 797  
 Carroll, G.W., see Rock, N.M.S., 277  
 Chakraborti, S., see Dasgupta, S., 200  
 Champness, P.E., see Rosenberg, P.E., 461  
 Channon, A., see Dubrawski, J.V., 187  
 Chermak, J.A., J.D. Rimstidt: Estimating the thermodynamic properties ( $\Delta G_f^\circ$  and  $\Delta H_f^\circ$ ) of silicate minerals at 298 K from the sum of polyhedral contributions, 1023  
 Chesner, C.A., A.D. Ettliger: Composition of volcanic allanite from the Toba Tuffs, Sumatra, Indonesia, 750  
 Clague, D.A., see Zamarreno, I., 1054  
 Clarke, R.S., Jr., see Buchwald, V.F., 656  
 Clinkenbeard, J.P., M.J. Walawender: Mineralogy of the La Posta pluton: Implications for the origin of zoned plutons in the eastern Peninsular Ranges batholith, southern and Baja California, 1258  
 Clowe, C.A., see Phillips, M.W., 764  
 Coates, D.A., see Cosca, M.A., 85  
 Coleman, R.G., J.G. Liou, A. El-Shazly, C. Oh, X. Wang, M. Enami: Review of Eclogites and Eclogite-Facies Rocks, edited by D.C. Smith, 1409  
 Colson, R.O., D. Gust: Effects of pressure on partitioning of trace elements between low-Ca pyroxene and melt, 31  
 Colville, A.A., see Novak, G.A., 488  
 Cosca, M.A., E.J. Essene, J.W. Geissman, W.B. Simmons, D.A. Coates: Pyrometamorphic rocks associated with naturally burned coal beds, Powder River Basin, Wyoming, 85  
 Courtney, S.F., see Browne, P.R.L., 759  
 Criddle, A.J., see Haggerty, S.E., 668  
 Crowley, K.D., see Hughes, J.M., 870  
 Cumbest, R.J., H.L.M. Van Roermund, M.R. Drury, C. Simpson: Burgers vector determination in clin amphibole by computer simulation, 586
- da Costa, L.M., see Keller, W.D., 1142  
 D'Arco, P., B. Piriou: Fluorescence spectra of Eu<sup>3+</sup> in synthetic polycrystalline anorthite: Distribution of Eu<sup>3+</sup> in the structure, 191  
 Damman, A.H.: Hydrothermal orthoamphibole-bearing assemblages from the Gasborn area, West Bergslagen, central Sweden, 573  
 Dasgupta, S., S. Chakraborti, P. Sengupta, P.K. Bhattacharya, H. Banerjee, M. Fukuoka: Compositional characteristics of kinoshitalite from the Sausar Group, India, 200  
 Davidson, P.M., D.H. Lindsley: Thermodynamic analysis of pyroxene-olivine-quartz equilibria in the system CaO-MgO-FeO-SiO<sub>2</sub>, 18  
 Davis, A.M., see Bryndzia, L.T., 236  
 de Villiers, J.P., P.R. Buseck: Stacking variations and nonstoichiometry in the bixbyite-braunite polysomatic mineral group, 1325  
 Dec, S.F., see Fitzgerald, J.J., 1405  
 Della Giusta, A., see Ottonello, G., 411, 1412 [erratum]  
 Della Ventura, G., see Parodi, G.C., 1278  
 Dias, O.L., see Isotani, S., 432  
 Dingwell, D.B.: Effect of fluorine on the viscosity of diopside liquid, 333  
 Dingwell, D.B.: Shear viscosities of ferrosilicate liquids, 1038  
 Dollase, W.A., see Reeder, R.J., 1159  
 Dove, M.T.: On the computer modeling of diopside: Toward a transferable potential for silicate minerals, 774  
 Downs, J.W.: Possible sites for protonation in beta-Mg<sub>2</sub>SiO<sub>4</sub> from an experimentally derived electrostatic potential, 1124  
 Downs, J.W., see Kingma, K.J., 1307  
 Dowse, M.E.: Memorial of Alice Mary Dowse Weeks, 694  
 Draheim, J.E., see Phillips, M.W., 764  
 Drury, M.R., see Cumbest, R.J., 586  
 Dubrawski, J.V., A. Channon, S.S.J. Warne: Examination of the siderite-magnesite mineral series by Fourier transform infrared spectroscopy, 187  
 Dunn, P.J., J.D. Grice, R.A. Bideaux: Pinalite, a new lead tungsten chloride mineral from the Mammoth mine, Pinal County, Arizona, 934  
 Dunn, P.J., C.A. Francis, R.A. Ramik, J.A. Nelen, J. Innes: Wiserite, an occurrence at the Kombat mine in Namibia, and new data, 1374  
 Dunn, P.J., see Grice, J.D., 1355  
 Dunn, P.J., see Kampf, A.R., 927  
 Dunn, P.J., see Pertlik, F., 1351  
 Dyar, M.D.: Applications of Mossbauer goodness-of-fit parameters to experimental spectra: Further discussion, 688  
 Dyar, M.D., A.V. McGuire, R.D. Ziegler: Redox equilibria and crystal chemistry of coexisting minerals from spinel lherzolite mantle xenoliths, 969
- Edgar, A.D.: Barium- and Sr-enriched apatites from lamproites from West Kimberley, Western Australia, 889  
 Eggleston, C.M., see Hochella, M.F., Jr., 1233  
 Eggleston, R.A., P.M. Ashley: Norrishite, a new manganese mica, K(Mn<sup>2+</sup>+Li)Si<sub>4</sub>O<sub>12</sub>, from the Hoskins mine, New South Wales, Australia, 1360  
 El-Shazly, A., see Coleman, R.G., 1409  
 Elings, V.B., see Hochella, M.F., Jr., 1233  
 Enami, M., see Coleman, R.G., 1409  
 Engel, P.: Memorial of Werner Nowacki, 1394  
 Ericksen, G.E., H.T. Evans, Jr., M.E. Mrose, J.J. McGee, J.W. Marinenko, J.A. Konnert: Mineralogical studies of the nitrate deposits

- of Chile: VI. Hectorfloresite,  $\text{Na}_9(\text{IO}_3)(\text{SO}_4)_4$ , a new saline mineral, 1207
- Erlank, A.J., see Haggerty, S.E., 668
- Essene, E.J., see Cosca, M.A., 85
- Ettlinger, A.D., see Chesner, C.A., 750
- Evans, H.T., Jr., see Ericksen, G.E., 1207
- Ferrow, E., see Skogby, H., 360
- Finger, L.W., R.M. Hazen, R.J. Hemley:  
BaCuSi<sub>2</sub>O<sub>6</sub>: A new cyclosilicate with four-membered tetrahedral rings, 952
- Finger, L.W., see Angel, R.J., 509
- Finger, L.W., see Angel, R.J., 599
- Finger, L.W., see Hazen, R.M., 352
- Fitzgerald, J.J., S.F. Dec, A.I. Hamza: Observation of five-coordinated Al in pyrophyllite dehydroxylate by solid-state <sup>27</sup>Al NMR spectroscopy at 14 T, 1405
- Fitzpatrick, J.J., see Hansley, P.L., 263
- Fleet, M.E., see Stone, W.E., 981
- Flohr, M.J.K., M. Ross: Alkaline igneous rocks of Magnet Cove, Arkansas: Metasomatized ijolite xenoliths from Diamond Jo quarry, 113
- Flotow, H.E., see Johnson, G.K., 697 [erratum]
- Foit, F.F., Jr.: Crystal chemistry of alkali-deficient schorl and tourmaline structural relationships, 422
- Foit, F.F., Jr., Y. Fuchs, P.E. Myers: Chemistry of alkali-deficient schorls from two tourmaline-dumortierite deposits, 1317
- Fontan, F., J.P. Fortune: Memorial of Francois Permingeat, 692
- Fontelles, M., see Benkerrou, C., 852
- Foord, E.E., see Kampf, A.R., 927
- Fortune, J.P., see Fontan, F., 692
- Francis, C.A., see Dunn, P.J., 1374
- Fuchs, Y., see Foit, F.F., Jr., 1317
- Fujimoto, M., see Akizuki, M., 1337
- Fukuoka, M., see Dasgupta, S., 200
- Furtado, W.W., see Isotani, S., 432
- Fyfe, W.S., see Zhou, Z., 1045
- Gasparik, T., see Angel, R.J., 599
- Geissman, J.W., see Cosca, M.A., 85
- Ghose, S., Y. Hexiong: Mn-Mg distribution in a C<sub>2/m</sub> manganooan cummingtonite: Crystal-chemical considerations, 1091
- Ghose, S., P.K. Sen Gupta, R.C. Boggs, E.O. Schlemper: Crystal chemistry of a non-stoichiometric carpholite, K<sub>x</sub>(Mn<sub>2-x</sub>Li<sub>x</sub>)Al<sub>4</sub>Si<sub>4</sub>O<sub>12</sub>(OH)<sub>4</sub>F<sub>4</sub>: A chain silicate related to pyroxenes, 1084
- Ghose, S., see Hatch, D.M., 1221
- Gibbs, G.V., see Bartelmehs, K.L., 620
- Gittins, J., see Jago, B.C., 936
- Goldsmith, J.R.: Acceptance of the Roebling Medal of the Mineralogical Society of America for 1988, 717
- Graeser, S., H. Schwander, R. Bianchi, T. Pilati, C.M. Gramaccioli: Geigerite, the Mn analogue of chudobaite: Its description and crystal structure, 676
- Gramaccioli, C.M., see Graeser, S., 676
- Grayevsky, A., see Heller-Kallai, L., 818
- Green, N.L., S.I. Usdansky: Toward a practical plagioclase-muscovite thermometer, 505 [erratum]
- Grew, E.S., see Beran, A., 812
- Grey, I.E., see Haggerty, S.E., 668
- Grice, J.D., P.J. Dunn: Sclarite, a new mineral from Franklin, New Jersey, with essential octahedrally and tetrahedrally coordinated zinc: Description and structure refinement, 1355
- Grice, J.D., see Dunn, P.J., 934
- Griffen, D.T., see Hatch, D.M., 151
- Guggenheim, S., S.W. Bailey: An occurrence of a modulated serpentine related to the greenalite-caryopilite series, 637
- Guggenheim, S., see Koster van Groos, A.F., 627
- Guo, Q., see Boettcher, S.L., 1383
- Gust, D., see Colson, R.O., 31
- Hackler, R.T., B.J. Wood: Experimental determination of Fe and Mg exchange between garnet and olivine and estimation of Fe-Mg mixing properties in garnet, 994
- Hafner, S.S., see Petrov, I., 604
- Hafner, S.S., see Petrov, I., 1130
- Haggerty, S.E., I.E. Grey, I.C. Madsen, A.J. Criddle, C.J. Stanley, A.J. Erlank: Hawthorneite, Ba[Ti<sub>3</sub>Cr<sub>4</sub>Fe<sub>4</sub>Mg]O<sub>19</sub>: A new metasomatic magnetoplumbite-type mineral from the upper mantle, 668
- Hamza, A.I., see Fitzgerald, J.J., 1405
- Hansley, P.L., J.J. Fitzpatrick: Compositional and crystallographic data on REE-bearing coffinite from the Grants uranium region, northwestern New Mexico, 263
- Harris, C.: Oxygen-isotope zonation of agates from Karoo volcanics of the Skeleton Coast, Namibia, 476
- Harris, D.C.: Review of Monteregian Treasures: The Minerals of Mont Saint-Hilaire, Quebec, by J.A. Mandarino, V. Anderson, 1409
- Hassan, I., P.R. Buseck: Incommensurate-modulated structure of nosean, a sodalite-group mineral, 394
- Hatch, D.M., D.T. Griffen: Phase transitions in the grandite garnets, 151
- Hatch, D.M., S. Ghose: Symmetry analysis of the phase transition and twinning in MgSiO<sub>3</sub> garnet: Implications to mantle mineralogy, 1221
- Hattori, K.: Barite-celestine intergrowths in Archean plutons: The product of oxidizing hydrothermal activity related to alkaline intrusions, 1270
- Hays, J.F., see Hemingway, B.S., 1417
- Hazen, R.M., L.W. Finger: High-pressure crystal chemistry of andradite and pyrope: Revised procedures for high-pressure diffraction experiments, 352
- Hazen, R.M., see Angel, R.J., 509
- Hazen, R.M., see Finger, L.W., 952
- Hazen, R.M., see McCormick, T.C., 1287
- Heathcote, R.C., G.R. McCormick: Major-cation substitution in phlogopite and evolution of carbonatite in the Potash Sulphur Springs complex, Garland County, Arkansas, 132
- Helfrich, G., B. Wood: Subregular model for multicomponent solutions, 1016

- Heller-Kallai, L., I. Miloslavski, A. Grayevsky: Evolution of hydrogen on dehydroxylation of clay minerals, 818
- Hemingway, B.S., J.F. Hays, G.L. Nord, Jr., J.H. Stout, J.A. Whitney: Report of the Financial Advisory Committee for 1988, 1417
- Hemley, R.J., see Finger, L.W., 952
- Henry, C.D., see Rubin, J.N., 865
- Hexiong, Y., see Ghose, S., 1091
- Hochella, M.F., Jr., C.M. Eggleston, V.B. Elings, G.A. Parks, G.E. Brown, Jr., C.M. Wu, K. Kjoller: Mineralogy in two dimensions: Scanning tunneling microscopy of semiconducting minerals with implications for geochemical reactivity, 1233
- Hoering, T.C., see Hofmeister, A.M., 281
- Hofmeister, A.M., J. Xu, H. Mao, P.M. Bell, T.C. Hoering: Thermodynamics of Fe-Mg olivines at mantle pressures: Mid- and far-infrared spectroscopy at high pressure, 281
- Hoisch, T.D.: A muscovite-biotite geothermometer, 565
- Holland, T.J.B.: Dependence of entropy on volume for silicate and oxide minerals: A review and a predictive model, 5
- Hughes, J.M., M. Cameron, K.D. Crowley: Structural variations in natural F, OH, and Cl apatites, 870
- Innes, J., see Dunn, P.J., 1374
- Isotani, S., W.W. Furtado, R. Antonini, O.L. Dias: Line-shape and thermal kinetics analysis of the Fe<sup>2+</sup> band in Brazilian green beryl, 432
- Jackson, S.L.: Extension of Wohl's ternary asymmetric solution model to four and n components, 14
- Jago, B.C., J. Gittins: Silver fluoride (AgF) as a source of fluorine in experimental petrology, 936
- Jain, H., see Xu, M.Y., 821
- Jambor, J.L., J. Puziewicz: New mineral names, 500
- Jambor, J.L., D.A. Vanko: New mineral names, 946
- Jambor, J.L.: New mineral names, 1215
- Jambor, J.L., E.A.J. Burke: New mineral names, 1399
- Jansen, J.B.H., see Bol, L.C., 439
- Jeanloz, R.: Acceptance of the Mineralogical Society of America Award for 1988, 720
- Johnson, G.K., H.E. Flotow, P.A.G. O'Hare, W.S. Wise: Thermodynamic studies of zeolites: Heulandite, 697 [erratum]
- Kampf, A.R., P.J. Dunn, E.E. Foord: Grandreefite, pseudograndreefite, laurelite, and aravaipaite: Four new minerals from the Grand Reef mine, Graham County, Arizona, 927
- Kanzaki, M., see Angel, R.J., 509
- Karabinos, P., see Banfield, J.F., 549
- Keller, W.D., L.M. da Costa: Comparative chemical compositions of aqueous extracts from representative clays, 1142
- Kingma, K.J., J.W. Downs: Crystal-structure analysis of a birefringent andradite, 1307
- Kirkpatrick, R.J., see Papenguth, H.W., 1152
- Kjoller, K., see Hochella, M.F., Jr., 1233
- Kleppa, O.J., see Bryndzia, L.T., 243
- Kohn, M.J., F.S. Spear: Empirical calibration of geobarometers for the assemblage garnet + hornblende + plagioclase + quartz, 77
- Kolker, A., D.H. Lindsley: Geochemical evolution of the Maloin Ranch pluton, Laramie Anorthosite Complex, Wyoming: Petrology and mixing relations, 307
- Konnert, J.A., see Ericksen, G.E., 1207
- Koster van Groos, A.F., S. Guggenheim: Dehydroxylation of Ca- and Mg-exchanged montmorillonite, 627
- Kroll, H., see Petrov, I., 604
- Kyser, T.K., see Luhr, J.F., 216
- Lagaly, G., see Beneke, K., 224
- Lager, G.A., T. Armbruster, F.J. Rotella, G.R. Rossman: OH substitution in garnets: X-ray and neutron diffraction, infrared, and geometric-modeling studies, 840
- Lawson, C.A., see Nord, G.L., Jr., 160
- Le Page, Y., see Moore, P.B., 1186
- Lehmann, G., see Vassilikou-Dova, A.B., 1182
- Liebermann, R.C., see Angel, R.J., 509
- Lindsley, D.H., see Davidson, P.M., 18
- Lindsley, D.H., see Kolker, A., 307
- Lintz, J., Jr.: Memorial of Vernon Edward Scheid, 494
- Liou, J.G., see Coleman, R.G., 1409
- Liu, T., D.C. Presnall: Diopside-tridymite liquidus boundary line in the system Mg<sub>2</sub>SiO<sub>4</sub>-CaMgSi<sub>2</sub>O<sub>6</sub>-SiO<sub>2</sub> at atmospheric pressure, 1032
- Livi, K.J.T., D.R. Veblen: Transmission electron microscopy of interfaces and defects in intergrown pyroxenes, 1070
- Lomelino, T.F., G. Mozurkewich: Semiconducting band gaps of three lead-antimony sulfosalts, 1285
- Longhi, J.: Review of Origins of Igneous Layering, edited by I. Parsons, 506
- Lorand, J.-P., see Parodi, G.C., 1278
- Luhr, J.F., T.K. Kyser: Primary igneous analcime: The Colima minettes, 216
- Luth, R.W.: Natural versus experimental control of oxidation state: Effects on the composition and speciation of C-O-H fluids, 50
- Mackenzie, F.T.: Memorial of Robert Minard Garrels, 497
- MacRae, N.D., see Stone, W.E., 981
- Madsen, I.C., see Haggerty, S.E., 668
- Makino, K., K. Tomita: Cation distribution in the octahedral sites of hornblendes, 1097
- Manceau, A.: Synthetic 10-A and 7-A phyllosilicates: Their structures as determined by EXAFS--Discussion, 1386
- Mao, H.-K., see Hofmeister, A.M., 281
- Maresch, W., see Redfern, S., 1293
- Marinenko, J.W., see Ericksen, G.E., 1207
- Martin, R.F.: Memorial of Gabrielle Donnay, 491
- Mascarenhas, Y.P., see Vencato, I., 456
- Mason, B.: Review of Mineral Deposits within the European Community, edited by J. Boissonnas and P. Omenetto, 696
- Mason, T.O., see Nell, J., 339

- Mattievich, E., see Vencato, I., 456
- McBriar, E.M., see Pring, A., 1377
- McCormick, G.R., see Heathcote, R.C., 132
- McCormick, T.C.: Review of Asbestos and Other Fibrous Materials, by H. Catherine W. Skinner, Malcolm Ross, and Clifford Frondel, 1409
- McCormick, T.C., R.M. Hazen, R.J. Angel: Compressibility of omphacite to 60 kbar: Role of vacancies, 1287
- McGee, E.S., see Ross, M., 367
- McGee, J.J., see Ericksen, G.E., 1207
- McGuire, A.V., see Dyar, M.D., 969
- McMillan, P., see Stebbins, J., 965
- Medenbach, O., see Velde, D., 1368
- Meike, A.: In situ deformation of micas: A high-voltage electron-microscope study, 780
- Menard, T., see Spear, F.S., 942
- Merlino, S., see Bernstein, L.R., 1177, 1412 [erratum]
- Merlino, S., see Rouse, R.C., 1195
- Metz, G.W., see Rouse, R.C., 1343
- Meunier, A., B. Velde: Solid solutions in I/S mixed-layer minerals and illite, 1106
- Mills, J.W.: Memorial of Charles D. Campbell, 944
- Miloslavski, I., see Heller-Kallai, L., 818
- Molin, G.M.: Crystal-chemical study of cation disordering in Al-rich and Al-poor orthopyroxenes from spinel lherzolite xenoliths, 593
- Molin, G.M., see Ottonello, G., 411, 1412 [erratum]
- Montana, A., M. Brearley: An appraisal of the stability of phlogopite in the crust and in the mantle, 1
- Montana, A., see Boettcher, S.L., 1383
- Montana, A., see White, B.S., 513
- Montez, B., see Papenguth, H.W., 1152
- Moore, P.B., P.K. Sen Gupta, E.O. Schlemper: Akrochordite,  $(\text{Mn,Mg})_5(\text{OH})_4(\text{H}_2\text{O})_4(\text{AsO}_4)_2$ : A sheet structure with amphibole walls, 256
- Moore, P.B., P.K. Sen Gupta, E.O. Schlemper: Kornerupine: Chemical crystallography, comparative crystallography, and its cation relation to olivine and to  $\text{Ni}_2\text{In}$  intermetallic, 642
- Moore, P.B.: Perception of structural complexity: Fillowite revisited and alpha-iron related, 918
- Moore, P.B., P.K. Sen Gupta, Y. Le Page: Magnetoplumbite,  $\text{Pb}^{2+}\text{Fe}_3^{2+}\text{O}_{19}$ : Refinement and lone-pair splitting, 1186
- Mora, C.I., J.W. Valley: Halogen-rich scapolite and biotite: Implications for metamorphic fluid - rock interaction, 721
- Mozurkewich, G., see Lomelino, T.F., 1285
- Mrose, M.E., see Ericksen, G.E., 1207
- Munoz, J.L.: Report of the Editor for 1988, 1417
- Muraishi, H.: Crystallization of silica gel in alkaline solutions at 100 to 180 °C: Characterization of  $\text{SiO}_2$ -Y by comparison with magadiite, 1147
- Myers, P.E., see Foit, F.F., Jr., 1317
- Mysen, B.O., D. Virgo: Redox equilibria, structure, and properties of Fe-bearing aluminosilicate melts: Relationships among temperature, composition, and oxygen fugacity in the system  $\text{Na}_2\text{O}-\text{Al}_2\text{O}_3-\text{SiO}_2-\text{FeO}$ , 58
- Nahon, D., see Parc, S., 466
- Navrotsky, A., see Brown, N.E., 902
- Nelen, J.A., see Dunn, P.J., 1374
- Nell, J., B.J. Wood: Thermodynamic properties in a multicomponent solid solution involving cation disorder:  $\text{Fe}_3\text{O}_4$ - $\text{MgFe}_2\text{O}_4$ - $\text{FeAl}_2\text{O}_4$ - $\text{MgAl}_2\text{O}_4$  spinels, 1000
- Nell, J., B.J. Wood, T.O. Mason: High-temperature cation distributions in  $\text{Fe}_3\text{O}_4$ - $\text{MgAl}_2\text{O}_4$ - $\text{MgFe}_2\text{O}_4$ - $\text{FeAl}_2\text{O}_4$  spinels from thermopower and conductivity measurements, 339
- Newton, R.C.: Presentation of the Roebling Medal of the Mineralogical Society of America for 1988 to Julian R. Goldsmith, 715
- Nichols, M.C., see Nickel, E.H., 940
- Nickel, E.H., M.C. Nichols: MINERAL: A computerized mineralogical reference manual for personal computers, 940
- Nishido, H., see Akizuki, M., 1337
- Nord, G.L., Jr., C.A. Lawson: Order-disorder transition - induced twin domains and magnetic properties in ilmenite-hematite, 160
- Nord, G.L., Jr., see Hemingway, B.S., 1417
- Norton, J.J.: Memorial of Willard Lincoln Roberts, 1397
- Notis, M.R., see Xu, M.Y., 821
- Novak, G.A., A.A. Colville: A practical interactive least-squares cell-parameter program using an electronic spreadsheet and a personal computer, 488
- O'Hare, P.A.G., see Johnson, G.K., 697 [erratum]
- Oh, C., see Coleman, R.G., 1409
- Ottonello, G., A. Della Giusta, G.M. Molin: Cation ordering in Ni-Mg olivines, 411, 1412 [erratum]
- Papenguth, H.W., R.J. Kirkpatrick, B. Montez, P.A. Sandberg:  $^{13}\text{C}$  MAS NMR spectroscopy of inorganic and biogenic carbonates, 1152
- Parc, S., D. Nahon, Y. Tardy, P. Vieillard: Estimated solubility products and fields of stability for cryptomelane, nsutite, birnesite, and lithiophorite based on natural lateritic weathering sequences, 466
- Parks, G.A., see Hochella, M.F., Jr., 1233
- Parodi, G.C., G. Della Ventura, J. Lorand: Mineralogy and petrology of an unusual osumilite + vanadium-rich pseudobrookite assemblage in an ejectum from the Vico Volcanic Complex (Latium, Italy), 1278
- Peacor, D.R., see Rouse, R.C., 1195
- Peacor, D.R., see Rouse, R.C., 1343
- Peacor, D.R., see Sarp, H., 1203
- Perkins, E.H., see Brown, T.H., 485
- Pertlik, F., P.J. Dunn: Crystal structure of wiserite, 1351
- Petrov, I., F. Yude, L.V. Bershov, S.S. Hafner, H. Kroll: Order-disorder of  $\text{Fe}^{3+}$  ions over the tetrahedral positions in albite, 604
- Petrov, I., A. Agel, S.S. Hafner: Distinct

- defect centers at oxygen positions in albite, 1130
- Phillips, M.W., J.E. Draheim, R.K. Popp, C.A. Clowe, A.A. Pinkerton: Effects of oxidation-dehydrogenation in tschermakitic hornblende, 764
- Pilati, T., see Graeser, S., 676
- Pinkerton, A.A., see Phillips, M.W., 764
- Piriou, B., see D'Arco, P., 191
- Plana, F., see Zamarreno, I., 1054
- Plesko, E.P., see Scheetz, B.E., 271
- Popp, R.K., see Phillips, M.W., 764
- Post, J.E., D.L. Bish: Rietveld refinement of the coronadite structure, 913
- Post, J.E., see Abbott, R.N., Jr., 141
- Post, J.E., see Abbott, R.N., Jr., 1300
- Post, J.E., see Bish, D.L., 177
- Presnall, D.C., see Liu, T., 1032
- Price, J.G., see Rubin, J.N., 865
- Pring, A.: Structural disorder in aikinite and krupkaite, 250
- Pring, A., E.M. McBriar, W.D. Birch: Mawbyite, a new arsenate of lead and iron related to tsumcorite and carminite, from Broken Hill, New South Wales, 1377
- Puziewicz, J., see Jambor, J.L., 500
- Rajabali, G.: Ordering behavior in albite using the modified sequential construction method: Reply, 484
- Ramik, R.A., see Dunn, P.J., 1374
- Redfern, S., E. Salje, W. Maresch, W. Schreyer: X-ray powder-diffraction and infrared study of the hexagonal to orthorhombic phase transition in K-bearing cordierite, 1293
- Reeder, R.J., W.A. Dollase: Structural variation in the dolomite-ankerite solid-solution series: An X-ray, Mossbauer, and TEM study, 1159
- Reichel, D.G., see Bernstein, L.R., 1177, 1412 [erratum]
- Ribbe, P.H.: Assessment of prestige and price of professional publications: Corrections and additions, 689
- Rimstidt, J.D., see Chermak, J.A., 1023
- Rock, N.M.S., G.W. Carroll: TRIPLOTT and ACF: General-purpose and metamorphic ACF-AKF-AFM triangular plotting programs for mainframes and microcomputers, 277
- Ronsbo, J.G.: Coupled substitutions involving REEs and Na and Si in apatites in alkaline rocks from the Ilimaussaq intrusion, South Greenland, and the petrological implications, 896
- Rosenberg, P.E., P.E. Champness: Zincian dolomites and associated carbonates from the Warynski mine, Poland: An AEM investigation, 461
- Ross, C.R., II: Ordering behavior in albite using the modified sequential construction method: Discussion, 482
- Ross, D.R., see Ross, M., 367
- Ross, M., E.S. McGee, D.R. Ross: Chemical and mineralogical effects of acid deposition on Shelburne Marble and Salem Limestone test samples placed at four NAPAP weather-monitoring sites, 367
- Ross, M., see Flohr, M.J.K., 113
- Rossmann, G.R., see Beran, A., 812
- Rossmann, G.R., see Lager, G.A., 840
- Rossmann, G.R., see Skogby, H., 1059
- Rotella, F.J., see Lager, G.A., 840
- Rouse, R.C., D.R. Peacor, S. Merlino: Crystal structure of pahasapaite, a berylllophosphate mineral with a distorted zeolite rho framework, 1195
- Rouse, R.C., D.R. Peacor, G.W. Metz: Sverigeite, a structure containing planar NaO<sub>4</sub> groups and chains of 3- and 4-membered beryllsilicate rings, 1343
- Rubin, J.N., C.D. Henry, J.G. Price: Hydrothermal zircons and zircon overgrowths, Sierra Blanca Peaks, Texas, 865
- Runnells, D.D.: Review of Eh-pH Diagrams for Geochemistry, by D.G. Brookins, 507
- Russ-Nabelek, C.: Isochemical contact metamorphism of mafic schist, Laramie Anorthosite Complex, Wyoming: Amphibole compositions and reactions, 530
- Russell, J.K., see Stanley, C.R., 273
- Salisbury, J.W., L.S. Walter, N. Vergo: Availability of a library of infrared (2.1 - 25.0 micrometers) mineral spectra, 938
- Salje, E., see Redfern, S., 1293
- Sandberg, P.A., see Papenguth, H.W., 1152
- Sarp, H., D.R. Peacor: Jaffeite, a new hydrated calcium silicate from the Kombat mine, Namibia, 1203
- Sauter, P.C.C., see Bol, L.C., 439
- Scheetz, B.E., W.A. Yarbrough, E.P. Plesko: A particulate-sample preparation technique for the laser Raman microprobe, 271
- Schlemper, E.O., see Ghose, S., 1084
- Schlemper, E.O., see Moore, P.B., 256
- Schlemper, E.O., see Moore, P.B., 642
- Schreyer, W., see Redfern, S., 1293
- Schreyer, W., see Velde, D., 1368
- Schryvers, D., see Bons, A., 1113
- Schwander, H., see Graeser, S., 676
- Sen Gupta, P.K., see Ghose, S., 1084
- Sen Gupta, P.K., see Moore, P.B., 642
- Sen Gupta, P.K., see Moore, P.B., 256
- Sen Gupta, P.K., see Moore, P.B., 1186
- Sengupta, P., see Dasgupta, S., 200
- Simmons, W.B., see Cosca, M.A., 85
- Simpson, C., see Cumbest, R.J., 586
- Skogby, H., E. Ferrow: Iron distribution and structural order in synthetic calcic amphiboles studied by Mossbauer spectroscopy and HRTEM, 360
- Skogby, H., G.R. Rossmann: OH<sup>-</sup> in pyroxene: An experimental study of incorporation mechanisms and stability, 1059
- Smelik, E.A., D.R. Veblen: A five-amphibole assemblage from blueschists in northern Vermont, 960
- Smyth, J.R.: Review of Occurrence, Properties and Utilization of Natural Zeolites, edited by D. Killo and H.S. Sherry, 696
- Smyth, J.R.: Review of International Tables for Crystallography, Vol. A: Space-Group Symmetry, edited by Theo Hahn, 696
- Spear, F.S., T. Menard: Program GIBBS: A

- generalized Gibbs method algorithm, 942
- Spear, F.S., see Kohn, M.J., 77
- Spearing, D.R., J.F. Stebbins: The  $^{29}\text{Si}$  NMR shielding tensor in low quartz, 956
- Springer, R.K.: Mineralogy of a layered gabbro deformed during magmatic crystallization, western Sierra Nevada foothills, California, 101
- Stamatakis, M.G.: A boron-bearing potassium feldspar in volcanic ash and tuffaceous rocks from Miocene lake deposits, Samos Island, Greece, 230
- Stanley, C.J., see Haggerty, S.E., 668
- Stanley, C.R., J.K. Russell: PEARCE.PLOT: Interactive graphics-supported software for testing petrologic hypotheses with Pearce element-ratio diagrams, 273
- Stebbins, J.F., P. McMillan: Five- and six-coordinated Si in  $\text{K}_2\text{Si}_4\text{O}_9$  liquid at 1.9 GPa and 1200 °C, 965
- Stebbins, J.F., see Spearing, D.R., 956
- Stewart, D.B.: Crustal processes in Maine, 698
- Stolper, E.: Temperature dependence of the speciation of water in rhyolitic melts and glasses, 1247
- Stone, W.E., M.E. Fleet, N.D. MacRae: Two-phase nickeliferous monosulfide solid solution (mss) in megacrysts from Mount Shasta, California: A natural laboratory for nickel-copper sulfides, 981
- Stormer, J.C., Jr., see Tacker, R.C., 877
- Stout, J.H., see Hemingway, B.S., 1417
- Su, S.: Review of Introduction to Optical Mineralogy, by William D. Nesse, 506
- Tacker, R.C., J.C. Stormer, Jr.: A thermodynamic model for apatite solid solutions, applicable to high-temperature geologic problems, 877
- Tardy, Y., see Parc, S., 466
- Tomita, K., see Makino, K., 1097
- Usdansky, S.I., see Green, N.L., 505 [erratum]
- Valley, J.W., see Mora, C.I., 721
- van der Plas, L., see van Doesburg, J.D.J., 1382
- van Doesburg, J.D.J., L. van der Plas: Protoastrakhanite discredited, 1382
- Van Roermund, H.L.M., see Cumbest, R.J., 586
- Vanko, D.A., see Jambor, J.L., 946
- Vassilikou-Dova, A.B., G. Lehmann: Four-valent vanadium in vanadinite, 1182
- Vazquez, A., see Zamarreno, I., 1054
- Veblen, D.R., see Angel, R.J., 509
- Veblen, D.R., see Banfield, J.F., 549
- Veblen, D.R., see Livi, K.J.T., 1070
- Veblen, D.R., see Smelik, E.A., 960
- Velde, B., see Meunier, A., 1106
- Velde, D., O. Medenbach, C. Wagner, W. Schreyer: Chayesite,  $\text{K}(\text{Mg}, \text{Fe}^{2+})_4\text{Fe}^{3+}[\text{Si}_{12}\text{O}_{30}]$ : A new rock-forming silicate mineral of the osumilite group from the Moon Canyon (Utah) lamproite, 1368
- Vencato, I., E. Mattievich, Y.P. Mascarenhas: Crystal structure of synthetic lipscombite: A redetermination, 456
- Vergo, N., see Salisbury, J.W., 938
- Vieillard, P., see Parc, S., 466
- Virgo, D., see Mysen, B.O., 58
- Wagner, C., see Velde, D., 1368
- Walawender, M.J., see Clinkenbeard, J.P., 1258
- Walker, J.R.: Polytypism of chlorite in very low grade metamorphic rocks, 738
- Walter, L.S., see Salisbury, J.W., 938
- Wang, X., see Coleman, R.G., 1409
- Warne, S.S.J., see Dubrawski, J.V., 187
- Waychunas, G.A.: Applications of Mossbauer goodness-of-fit parameters to experimental spectra: A discussion of random noise versus systematic effects, 685
- Weidner, D.J., see Angel, R.J., 509
- Weidner, J.R.: Welding silver and silver alloy containers for high-temperature and high-pressure experiments, 1385
- White, B.S., M. Brearley, A. Montana: Solubility of argon in silicate liquids at high pressures, 513
- Whitney, J.A.: Report of the Treasurer for 1988, 1414
- Whitney, J.A., see Hemingway, B.S., 1417
- Wise, W.S., see Johnson, G.K., 697 [erratum]
- Woessner, D.E.: Characterization of clay minerals by  $^{27}\text{Al}$  nuclear magnetic resonance spectroscopy, 203
- Wones, D.R.: Significance of the assemblage titanite + magnetite + quartz in granitic rocks, 744
- Wood, B.J., see Hackler, R.T., 994
- Wood, B.J., see Helffrich, G., 1016
- Wood, B.J., see Nell, J., 339
- Wood, B.J., see Nell, J., 1000
- Wood, C.P., see Browne, P.R.L., 759
- Wu, C.M., see Hochella, M.F., Jr., 1233
- Xu, J., see Hofmeister, A.M., 281
- Xu, M.Y., H. Jain, M.R. Notis: Electrical properties of opal, 821
- Yarbrough, W.A., see Scheetz, B.E., 271
- Yude, F., see Petrov, I., 604
- Zakrzewski, M.A.: Chromian spinels from Kusa, Bergslagen, Sweden, 448
- Zamarreno, I., F. Plana, A. Vazquez, D.A. Clague: Motukoreaite: A common alteration product in submarine basalts, 1054
- Zhou, Z., W.S. Fyfe: Palagonitization of basaltic glass of DSDP Site 335, Leg 37: Textures, chemical composition, and mechanism of formation, 1045
- Ziegler, R.D., see Dyar, M.D., 969

- Ag containers, technique for welding, 1385
- AgBi<sub>2</sub>Te<sub>4</sub> mineral, 946
- AgF as a source of F, 936
- Ag<sub>2</sub>Pb<sub>13</sub><sub>5</sub>Bi<sub>9</sub>S<sub>28</sub> mineral, 946
- Ag<sub>2</sub>S-As<sub>2</sub>S<sub>3</sub>, 243
- Ag<sub>2</sub>S-Bi<sub>2</sub>S<sub>3</sub>, 243
- Ag<sub>2</sub>S-Sb<sub>2</sub>S<sub>3</sub>, 243
- <sup>27</sup>Al in 2:1 clay minerals, 203
- (Al,Si) in albite, 1130
- (Al,Si) in herschelite, 1337
- (Al,Si) in muscovite, 141
- Ar in silicate liquid, 513
- Au-Bi sulfide, 946
- Au<sub>3</sub>Hg, 500
- Abhurite, 500
- ACF, AKF, AFM (Eskola) plots, 277
- Acid dissolution of limestone and marble, 367
- Acid rain, 367
- Actinolite, 960
- Agate, oxygen isotopes in, 476
- Aikinite, 250
- Akaganeite, 656
- Akrochordite, 256
- Albite, 482, 484
- (Al,Si) in, 1130
- electron-hole centers in, 1130
- Fe<sup>3+</sup> in, 604
- solidus of, 513
- Alkali carbonates, 1152
- Alkali feldspar, 1258
- Alkali-deficient schorl, 1317
- Alkaline rocks, apatite in, 896
- Allanite-bearing magmas, 750
- Alleghanyite, 1300
- Aluminosilicate melts, Fe-bearing, 58
- Amphibole, 307
- calcic, 360
- exsolution lamellae, 960
- See also individual amphiboles
- Analcime, 216
- Analysis, chemical (mineral)
- actinolite, 960
- aikinite, 250
- akaganeite, 656
- alkali feldspar, 1258
- alkali-deficient schorl, 1317
- allanite, 750
- amphibole, 307
- analcime, 216
- andradite, 840, 1307
- ankerite, 1159
- apatite, 113, 889, 896, 1270
- aravaipaite, 927
- authigenic K-feldspar, 230
- Ba-Ti - rich phlogopite, 439
- barite, 1270
- biotite, 101, 113, 307, 565, 573, 586, 721, 1258, 1270
- bixbyite, 1325
- braunite-II, 1325
- Cr<sup>2+</sup>-bearing enstatite, 599
- calcic amphibole, 101
- cancrinite, 113
- carbonate, zincian, 461
- celestine, 1270
- chalcocite, 236
- chalcopyrite, 981
- chalcostibite, 236
- chayesite, 1368
- chlorapatite, 870
- chlorite, 549
- chloritoid, 549
- chromian spinel, 448
- chromite, 448
- clay minerals, 1045
- clinoamphibole, 586
- clinopyroxene, 85, 132, 981
- coronadite, 177, 913
- cumingtonite, 960
- disordered braunite, 1325
- dolomite, zincian, 461
- dorrite, 85
- enstatite, Cr<sup>2+</sup>-bearing, 599
- Fe-Ti oxides, 101, 307
- feldspar, 307
- ferroan dolomite, 1159
- fluorapatite, 870
- friedrichite, 250
- garnet, 113, 565
- geigerite, 676
- glaucophane, 960
- goldmanite, 852
- grandreefite, 927
- hawthorneite, 668
- hectorfloresite, 1207
- hematite, 85, 1278
- hercynite, 1278
- herschelite, 1337
- hollandite, 177
- hornblende, 530, 960, 1097, 1258
- hydroxylapatite, 870
- illite/smectite mixed-layer minerals, 1106
- ilmenite, 113, 530, 1258
- jaffeite, 1203
- K-feldspar, authigenic, 230
- kinoshitalite, 200
- laurelite, 927
- magadiite and its K analogue, 224
- magnetite, 113, 448, 530
- mawbyite, 1377
- melilite, 85
- minnesotaite, 384
- monosulfide solid solution, 981
- motukoreaite, 1054
- mullite, 85
- muscovite, 565, 1258
- Ni-Mg olivine, 411, 1412 [erratum]
- natrolite, 113
- nepheline, 85, 113
- norrishite, 1360
- olivine, 85, 101, 307, 530, 981
- olivine (synthetic), 37
- olivine, Ni-Mg, 411, 1412 [erratum]
- omphacite, 1287
- opal, 821
- orthoamphibole, 573
- orthopyroxene, 85, 593, 981
- osumilite, 1278
- palagonite, 1045
- pargasite, 1097
- pentlandite, 981
- perovskite, 113
- phlogopite, 132
- phlogopite, Ba-Ti - rich, 439
- pinalite, 934
- plagioclase, 101, 530, 565, 586, 1258
- potassium silicate, 224
- pseudobrookite, 85, 1278
- pseudograndreefite, 927
- pyroxene, 101, 113, 307, 530, 1059
- pyrrhotite, 981
- renierite, 1177, 1412 [erratum]
- romanechite, 177
- Sb-Cu alloy, 236
- scapolite, 721
- schorl, 422, 1317
- sclarite, 1355
- siderite-magnesite solid solutions, 187
- silicic acids (crystalline), 224
- sillimanite, 812
- skinnerite, 236
- sphene (= titanite), 113
- spinel, 85
- staurolite, 610
- titanian andradite, 840
- titanomagnetite, 1278
- todorokite, 177
- triangular plots (ACF, AKF, AFM), 277
- vanadian amphibole, 852
- vanadian diopside, 852
- vanadian grossular, 852
- winchite, 960
- wiserite, 1374
- zincian carbonate, 461
- zincian dolomite, 461
- zircon, 865
- See also New mineral data (abstracts), New minerals (abstracts), Unnamed minerals
- Analysis, chemical (rock)
- anorthosite, 307
- biotite gabbro, 307
- clinker, 85
- ferrodiorite, 307
- ferromonzonite, 307
- granite, 307
- ijolite, 113
- mafic hornfels, 530
- minette, 216
- monzonite, 1270
- monzosyenite, 307
- paralava, 85
- Salem Limestone, 367
- Shelburne Marble, 367

- syenite, 1270  
 triangular plots, 277  
 tuff and tuffite, 230  
 vanadian-bearing calcareous metapelite, 852  
 vanadian-bearing skarn, 852  
 Andradite, 744, 840  
 Andradite (anisotropic), 1307  
 Andradite at high pressure, 352  
 Anisotropic pyrite, 1168  
 Ankerite, 1159  
 Annite - quartz - K-feldspar - fayalite - H<sub>2</sub>O, 307  
 Anorthite  
   REE distribution in, 191  
   solidus of, 513  
 Anorthosite, 1070  
 Anorthosite-syenite-granite association, 307  
 Antarctica  
   meteorites, 656  
   pargasite, 1097  
 Apatite, 113, 889, 1270  
   in alkaline rocks, 896  
   REEs in, 896  
   saturation, 307  
   solid solutions, 877  
 Aqueous extracts from clays, 1142  
 Aragonite, 1152  
 Aravaipaite, 927  
 Arizona  
   aravaipaite, 927  
   grandreefite, 927  
   laurelite, 927  
   pinalite, 934  
   pseudograndreefite, 927  
   spinel lherzolite, 969  
 Arkansas  
   carbonatite, 132  
   garnet, 113  
   ijolite, 113  
   mica, 132  
   pyroxene, 113  
 Arsenate, 1399  
 Atmospheric chemistry, 367  
 Augite, 1070  
 Australia  
   coronadite, 177  
   norrishite, 1360  
   orthopyroxene, 593  
   schorl, 1317  
 Authigenic K-feldspar, 230  
 Authors, guidelines for, 1225  
 Awards  
   MSA Award, acceptance of, 720  
   MSA Award, presentation of, 719  
   Roebbling Medal, acceptance of, 717  
   Roebbling Medal, presentation of, 715  
 Ba-bearing authigenic K-feldspar, 230  
 Ba-Ti - rich phlogopite, 439  
 BaCuSi<sub>2</sub>O<sub>6</sub> (synthetic), 952  
 Bi selenides, 946  
 Bi<sub>2</sub>S<sub>3</sub>-CuPbBiS<sub>3</sub>, 250  
 Bi<sub>3</sub>(Se,S)<sub>2</sub> mineral, 946  
 Barite, 1270  
 Basalt, low-temperature alteration in submarine, 1054  
 Basaltic glass, 1045  
 Basalts, Kilauea, 273  
 Baumite, 637  
 Bazhenovite, 500  
 Berthierine, 549  
 Beryl, reduction of Fe<sup>3+</sup> in, 432  
 Beryllosilicate rings, 1343  
 Beta-iridisite, 1215  
 Beta-Mg<sub>2</sub>SiO<sub>4</sub>, 1124  
 Biotite, 101, 113, 565, 586, 780, 1258, 1270  
   and fluid interaction, 721  
   F and Cl in, 573  
 Biotite gabbro, 307  
 Birnessite, 466  
 Bixbyite, 1325  
 Blatterite, 1399  
 Blueschist, 960  
 Book reviews  
   Carpenter, M.A.: Feldspar Minerals, Volume 1 by J.V. Smith and W.L. Brown, 506  
   Coleman, R.G., Liou, J.G., El-Shazly, A., Oh, C., Wang, X., Enami, M., Maruyama, S.: Eclogites and Eclogite-Facies Rocks edited by D.C. Smith, 1409  
   Harris, D.C.: Monteregian Treasures: The Minerals of Mont Saint-Hilaire, Quebec by J.A. Mandarino and V. Anderson, 1409  
   Longhi, J.: Origins of Igneous Layering edited by I. Parsons, 506  
   Mason, B.: Mineral Deposits within the European Community edited by J. Boissonnas and P. Omenetto, 696  
   McCormick, T.C.: Asbestos and Other Fibrous Materials by H.C.W. Skinner, M. Ross, and C. Frondel, 1409  
   Runnells, D.D.: Eh-pH Diagrams for Geochemistry by D.G. Brookins, 506  
   Smyth, J.R.: Occurrence, Properties and Utilization of Natural Zeolites edited by D. Kallo and H.S. Sherry, 696  
   Smyth, J.R.: International Tables for Crystallography, Volume A. Space-Group Symmetry edited by T. Hahn, 696  
   Su, S.-C.: Introduction to Optical Mineralogy by W.D. Nesse, 506  
 Books received, 1412  
 Boulangerite, 1285  
 Bowieite, 1215  
 Braunitz-II, 1325  
 Bravoite, 1168  
 Brazil  
   beryl, 432  
   manganese oxide, 466  
   manganese oxyhydroxide, 466  
 Brokenhillite, 1399  
 Burgers vectors in clin amphibole, 586  
 Bursaitite, 1399  
 C-H fluids at high pressure and temperature, 50  
 Ca-exchanged montmorillonite, 627  
 CaCO<sub>3</sub>-CaSO<sub>4</sub>-Ca(NO<sub>3</sub>)<sub>2</sub>-H<sub>2</sub>O, 367  
 CaCO<sub>3</sub>-CaSO<sub>4</sub>-H<sub>2</sub>O, 367  
 CaCO<sub>3</sub>-MgCO<sub>3</sub>-FeCO<sub>3</sub>, 1159  
 CaMg(CO<sub>3</sub>)<sub>2</sub>-CaZn(CO<sub>3</sub>)<sub>2</sub>-Ca(Fe,Mn)(CO<sub>3</sub>)<sub>2</sub>, 461  
 CaO-MgO-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>, 325  
 CaO-SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-FeO-H<sub>2</sub>O, 759  
 Cl in orthoamphibole and biotite, 573  
 Cl-F in metamorphic fluid, 721  
 Cl-rich biotite, 721  
 Cl-rich scapolite, 721  
 Cr-bearing aluminohydroxcalcite, 946  
 Cr<sup>2+</sup>-bearing enstatite, 599  
 Cs<sub>2</sub>CO<sub>3</sub>, 1152  
 (Cu,Ag)<sub>3-x</sub>(Bi,Pb)<sub>7+x</sub>(S,Sc)<sub>12</sub>, 946  
 CuAg<sub>3</sub>Pb<sub>13</sub>Sb<sub>17</sub>S<sub>40</sub> mineral, 946  
 Cu<sub>2</sub>S-Sb<sub>2</sub>S<sub>3</sub>, liquidus relations in, 236  
 Calc-silicates in hydrothermal fluid, 759  
 Calcic amphibole, 101  
 Calcic amphibole, Fe-Mg in, 360  
 Calcite, 367, 1152  
 Calculation of P-T paths, 942  
 Calculation of phase diagrams, 485  
 California  
   biotite, 1258  
   gabbro, 101  
   granodiorite, 1258  
   hornblende, 1258  
   pelitic schist, 565  
   spinel lherzolite, 969  
   titanian andradite, 840  
   two-phase monosulfide solid solution, 981  
 Campbell, Charles D., Memorial of, 944  
 Canada  
   aikinite, 250  
   lindstromite, 250  
 Cancrinite, 113  
 Cannizzarite, 1399  
 Carbonate, zincian, 461  
 Carbonatite, 132, 936  
 Carminite, 1377  
 Carpholite, nonstoichiometric, 1084

- Caryopillite, 637  
 Cation ordering  
   in MgTi<sub>2</sub>O<sub>5</sub>, 902  
   in Ni-Mg olivine, 411, 1412  
   [erratum]  
 Celestine, 1270  
 Central Maine synclinorium, 698  
 Cerussite, 1152  
 Cesplumtantite, 500  
 Cetineite, 1399  
 Chain Lakes massif, 698  
 Chalcedony, oxygen isotopes in,  
   476  
 Chalcocite, 236  
 Chalcopyrite, 981  
 Chalcostibite, 236  
 Chayesite, 1368  
 Chekhovichite, 1399  
 Chemistry chemistry  
   pyrite-group minerals, 1168  
 Chernikovite, 1399  
 Chile  
   nitrate deposits, 1207  
 Chlorapatite, 870, 877  
 Chlorite, 141, 549, 1113  
 Chlorite polytypes in low-grade  
   rocks, 738  
 Chloritoid isograd, 549  
 Chondrodite, 1300  
 Chromian spinels, 448  
 Chromite, 448  
 Chudobaite, 676  
 Chvilevaite, 946  
 Clay minerals, 1045  
 Clays, aqueous extracts from,  
   1142  
 Clays, dehydroxylation of, 818  
 Clinker, 85  
 Clin amphibole, 586  
 Clinopyroxene, 85, 132, 969,  
   981  
 Clintonite, 141  
 Cobaltaustinite, 500  
 Coffinite, 263  
 Committees of MSA for 1989,  
   1423  
 Composition-viscosity relation-  
   ships, 1038  
 Compressibility measurements  
   andradite, 352  
   omphacite, 1287  
   pyrope, 352  
 Computer programs  
   calculation of phase  
     diagrams, 485  
   fluid-inclusion data reduc-  
     tion, 1390  
   generalized Gibbs method  
     algorithm, 942  
   interactive least-squares  
     cell-parameter program,  
     488  
   mineral database, 940  
   Pearce element-ratio diagram,  
     273  
   triangular diagrams, 277  
 Conductivity measurements in  
   spinel solid solutions, 339  
 Configurational energy, 484  
 Configurational entropy, 482  
 Contact metamorphism, 530  
 Coordination  
   [5]Al, 1405  
   [5]Si and [6]Si, 965  
 Cordierite, synchrotron powder-  
   diffraction study of, 1293  
 Coronadite, 177, 913  
 Coupled substitution in tour-  
   maline, 826  
 Crichtonite-group mineral, 1399  
 Crookesite, 1399  
 Crustal processes, 698  
 Cryptomelane, 466  
 Crystal growth  
   calcite, 367  
   epidote, 759  
   grossular, 859  
   gypsum, 367  
   herschelinite, 1337  
   phlogopite, 132  
   prehnite, 759  
   pyroxene, 1070  
   wairakite, 759  
 Crystal structure  
   aikinite, 250  
   akrochordite, 256  
   alleganyite, 1300  
   andradite, 1307  
   andradite at high pressure,  
     352  
   anisotropic pyrite, 1168  
   ankerite, 1159  
   BaCuSi<sub>2</sub>O<sub>6</sub> (synthetic), 952  
   Cr<sup>2+</sup>-bearing enstatite, 599  
   carpholite, nonstoichio-  
     metric, 1084  
   chlorapatite, 870  
   chondrodite, 1300  
   chudobaite, 676  
   coronadite, 913  
   diopside, 774  
   enstatite, Cr<sup>2+</sup>-bearing, 599  
   ferroan dolomite, 1159  
   fillowite, 918  
   fluorapatite, 870  
   friedrichite, 250  
   geigerite, 676  
   hammarite, 250  
   hawthorneite, 668  
   hectorfloresite, 1207  
   hibschite, 840  
   hornblende, 764, 1097  
   hydroxylapatite, 870  
   kornrupine, 642  
   lindstromite, 250  
   lipscombite, 456  
   magnetoplumbite, 1186  
   manganian cummingtonite, 1091  
   minnesotaite, 384  
   monosulfide solid solution,  
     981  
   Ni-Mg olivine, 411, 1412  
   [erratum]  
   norbergite, 1300  
   nosean, 394  
   orthopyroxene, 593  
   pahasapaite, 1195  
   pargasite, 1097  
   phyllo-manganate, 1386  
   pyrite, anisotropic, 1168  
   pyrope at high pressure, 352  
   renierite, 1177, 1412 [er-  
     ratum]  
   schorl, 422  
   sclarite, 1355  
   staurolite, 610  
   sverigeite, 1343  
   titanian andradite, 840  
   titanian clinohumite, 1300  
   todorokite, 177  
   tschermakitic hornblende, 764  
   wiserite, 1351  
 Crystal structure (surface)  
   galena, 1233  
   hematite, 1233  
 Crystal synthesis  
   BaCuSi<sub>2</sub>O<sub>6</sub> (synthetic), 952  
   boulangerite, 1285  
   Cr<sup>2+</sup>-bearing enstatite, 599  
   calcic amphibole, 360  
   hectorfloresite, 1207  
   hibschite, 840  
   lipscombite, 456  
   magnesian calcite, 1152  
   Ni-Mg olivine, 411, 1412  
   [erratum]  
   potassium silicate, 224  
   SiO<sub>2</sub>-Y (magadiite), 1147  
   vaterite, 1152  
 Cuba  
   todorokite, 177  
 Cumingtonite, 960  
   Mn-Mg in, 1091  
 Czechoslovakia  
   heteromorphite, 1285  
  
 Data reduction by microcom-  
   puter, 1390  
 Deformation (in situ)  
   biotite, 780  
   muscovite, 780  
 Dehydroxylation of clays, 818  
 Dielectric behavior of opal,  
   821  
 Diopside, 1059  
   elastic properties of, 774  
   solidus of, 513  
 Diopside melt, viscosity of,  
   333  
 Diopside-tridymite boundary  
   line, 1032  
 Dirichlet domains, 918  
 Discredited mineral  
   protoastrakhanite (= konyaitite), 1382  
 Disordered braunite, 1325  
 Dolomite, 1152, 1159  
   zincian, 461  
 Donnay, Gabrielle, Memorial of,  
   491  
 Dorrite, 85

- Drugmanite, 946  
 DTA, TGA  
   Ca- and Mg-exchanged  
   montmorillonites, 627  
 coronadite, 177  
 marganite, 177  
 pyrolusite, 177  
 romanechite, 177  
 SiO<sub>2</sub>-Y (magadiite), 1147  
 sillimanite, 812  
 todorokite, 177  
 wiserite, 1374  
 Dumontite, 1399
- Eu<sup>3+</sup> in anorthite, 191  
 Ecdrewsite, 500  
 Editor, 1988 Report of the,  
 1417  
 Ehrleite, 500  
 Elastic properties of diopside,  
 774  
 Electrical properties  
   boulangerite, 1285  
   conductivity measurements in  
   spinel solid solutions,  
   339  
   heteromorphite, 1285  
   jamesonite, 1285  
   opal, 821  
   thermopower measurements in  
   spinel solid solutions,  
   339  
 Electron-hole centers in al-  
 bite, 1130  
 Electron diffraction  
   aikinite, 250  
   ankerite, 1159  
   berthierine, 549  
   biotite, 780  
   bixbyite, 1325  
   braunite-II, 1325  
   chlorite, 549, 1113  
   chloritoid, 549  
   disordered braunite, 1325  
   ferroan dolomite, 1159  
   friedrichite, 250  
   hammarite, 250  
   ilmenite-hematite, 160  
   lindstromite, 250  
   minnesotaitite, 384  
   muscovite, 780  
   neltnerite, 1325  
   nosean, 394  
   opal, 821  
   paragonite, 549  
   stilpnomelane, 549  
   unnamed modulated layer  
   silicate, 637  
   zincian dolomite, 461  
 Electron diffraction (low  
 energy)  
   galena, 1233  
   hematite, 1233  
 Electron microscopy  
   aikinite, 250  
   amphibole exsolution  
   lamellae, 960  
   ankerite, 1159  
   augite, 1070  
   authigenic K-feldspar, 230  
   barite, 1270  
   basaltic glass, 1045  
   berthierine, 549  
   biotite, 780  
   bixbyite, 1325  
   braunite-II, 1325  
   calcic amphibole, 360  
   celestine, 1270  
   chlorite, 549, 1113  
   chloritoid, 549  
   clinoamphibole, 586  
   coffinite, 263  
   disordered braunite, 1325  
   ferroan dolomite, 1159  
   friedrichite, 250  
   hammarite, 250  
   hectorfloresite, 1207  
   ilmenite-hematite, 160  
   K-feldspar, authigenic, 230  
   kalsilite, 797  
   lindstromite, 250  
   minnesotaitite, 384  
   modulated layer silicate, 637  
   motukoreaite, 1054  
   muscovite, 780  
   neltnerite, 1325  
   nosean, 394  
   opal, 821  
   orthopyroxene, 1070  
   palagonite, 1045  
   paragonite, 549  
   pigeonite, 1070  
   potassium silicate, 224  
   stilpnomelane, 549  
   zincian dolomite, 461  
 Electrostatic potential, 1124  
 Enstatite, Cr<sup>2+</sup>-bearing, 599  
 Enstatite-diopside join, 325  
 Enthalpies of disordering of  
 Fe<sup>2+</sup>-Fe<sup>3+</sup>, Mg-Fe<sup>3+</sup>, Fe<sup>2+</sup>-Al,  
 and Mg-Al in spinels, 339  
 Enthalpies of formation of  
 trechmannite, smithite, and  
 proustite, 243  
 Enthalpy of solution of Ar in  
 liquids, 513  
 Entropy-volume relations,  
 review of, 5  
 Epidote, 759  
 EPR spectroscopy  
   albite, 604  
   electron-hole centers in  
   albite, 1130  
   hectorfloresite, 1207  
   vanadinite, 1182  
 Errata  
   cation ordering in Ni-Mg  
   olivine, 1412  
   plagioclase-muscovite ther-  
   mometer, 505  
   renierite crystal structure,  
   1412  
   thermodynamics of heulandite,  
   697  
 Eskebornite, 1399  
 Estimation of delta G<sub>f</sub> and  
 delta H<sub>f</sub> for silicates, 1023  
 EXAFS, 1386  
 Expansivity measurements  
   karrooite (MgTi<sub>2</sub>O<sub>5</sub>), 902  
 Experimental petrology  
   Ag containers, technique for  
   welding, 1385  
   AgF as a source of F, 936  
   aluminosilicate melts, Fe-  
   bearing, 58  
   Ca-exchanged montmorillonite,  
   627  
   Cu<sub>2</sub>S-Sb<sub>2</sub>S<sub>3</sub>, liquidus rela-  
   tions in, 236  
   diopside-tridymite boundary  
   line, 1032  
   enstatite-diopside join, 325  
   F, AgF as a source of, 936  
   Fe-bearing aluminosilicate  
   melts, 58  
   Fe-Mg exchange between garnet  
   and olivine, 994  
   gas-loading device, 1383  
   hydrothermal silica-gel  
   synthesis, 1147  
   liquidus relations in  
   Cu<sub>2</sub>S-Sb<sub>2</sub>S<sub>3</sub>, 236  
   melting in the system  
   NaAlSi<sub>3</sub>O<sub>8</sub>-C-O-H, 50  
   Mg-exchanged montmorillonite,  
   627  
   olivine + supercritical  
   aqueous chlorides, 37  
   phlogopite, 1  
   pyroxene, OH in, 1059  
   rhyolitic melts and glasses,  
   1247  
   shear viscosities of silicate  
   melt, 1038  
   technique for welding Ag  
   containers, 1385  
   trace-element partitioning at  
   high pressure, 31  
 F, AgF as a source of, 936  
 F, effect on melt viscosity,  
 333  
 F and Cl in orthoamphiboles and  
 coexisting biotite, 573  
 F in carbonatite, 936  
 F-rich hydrothermal fluid, 865  
 Fe<sup>3+</sup> in albite, 604  
 Fe in magnetoplumbite, 1186  
 Fe-bearing aluminosilicate  
 melt, 58  
 Fe-Mg exchange between garnet  
 and olivine, 994  
 Fe-Mg in calcic amphibole, 360  
 Fe-Ti oxides, 101, 307  
 (Fe<sup>3+</sup>, Al) in andradite, 1307  
 (Fe<sup>2+</sup>, Mg)(Fe<sup>3+</sup>, Al)<sub>2</sub>O<sub>4</sub> spinels,  
 1000  
 Fe<sub>3</sub>O<sub>4</sub>-FeAl<sub>2</sub>O<sub>4</sub>, 339  
 Fe<sub>3</sub>O<sub>4</sub>-FeCr<sub>2</sub>O<sub>4</sub>-Mg<sub>0.7</sub>Fe<sub>0.3</sub>Al<sub>2</sub>O<sub>4</sub>,  
 448

- $\text{Fe}_3\text{O}_4\text{-MgAl}_2\text{O}_4$ , 339  
 $\text{Fe}_3\text{O}_4\text{-MgFe}_2\text{O}_4$ , 339  
 Fahleite, 500  
 Fayalite, 281  
 Feldspar, 307  
   See also individual feldspars  
 Fergusonite-(Ce), 946  
 Fergusonite-(Nd), 946  
 Ferrian diopside, 1059  
 Ferristrunzite, 500  
 "Ferritchromit," 448  
 Ferroan dolomite, 1159  
 Ferrodiorite, 307  
 Ferromonzonite, 307  
 Ferrosilicate melt, 1038  
 Fillowite, 918  
 Financial Advisory Committee,  
   1988 Report of the, 1417  
 Fine-grained tuff and tuffite,  
   230  
 Five-amphibole assemblage, 960  
 Fluid inclusions  
   data reduction by microcom-  
   puter, 1390  
 Fluid-rock interaction, 721  
 Fluorapatite, 870  
 Fluorellestadite, 500  
 Fluoro-hydrograndite, 113  
 Formation of Moho, 698  
 Former MSA officers and meeting  
   places, list of, 1420  
 Forsterite, 281  
 Forsterite-bearing marble, 439  
 Four-membered silicate rings,  
   952  
 France  
   goldmanite, 852  
 Friedrichite, 250  
 Fukuchilite, 1168
- Gabbro, 101  
 Gabon  
   manganese oxide, 466  
   manganese oxyhydroxide, 466  
 Galena, 1233  
 Gamma- $\text{Na}_2\text{CO}_3$ , 1152  
 Garnet, 113, 565, 994  
    $\text{MgSiO}_3$ , 1221  
   See also individual garnets  
 Garnet amphibolite, 77  
 Garnet + hornblende +  
   plagioclase + quartz  
   geobarometer, 77  
 Garrels, Robert Minard,  
   Memorial of, 497  
 Gas-loading device, 1383  
 Geigerite, 676  
 Generalized Gibbs method algo-  
   rithm, 942  
 Geobarometry  
   garnet amphibolite, 77  
   hornblende, 307, 1258  
   olivine, 307  
   olivine + pyroxene + quartz,  
   18  
   pigeonite, 307  
   pyroxene, 18  
   subregular model for multi-  
   component solutions, 1016
- Geochemistry  
   Ar in silicate liquid, 513  
   acid rain, 367  
   alkali-deficient schorl, 1317  
   allanite-bearing magmas, 750  
   anorthite, REEs in, 191  
   apatite, 889  
   apatite, REEs in, 896  
   aqueous extracts from clays,  
   1142  
   atmospheric chemistry, 367  
   authigenic K-feldspar, 230  
   basalt, low-temperature  
   alteration in submarine,  
   1054  
   basalts, Kilauea, 273  
   biotite, F and Cl in, 573  
   C-O-H fluids at high pressure  
   and temperature, 50  
   Cl in orthoamphibole and  
   biotite, 573  
   Cl-rich biotite, 721  
   Cl-rich scapolite, 721  
   carbonate systems, F in, 936  
   clays, aqueous extracts from,  
   1142  
   clinker, 85  
   coffinite, 263  
   coupled substitution in  
   tourmaline, 826  
   F and Cl in orthoamphiboles  
   and coexisting biotite,  
   573  
   F in carbonate systems, 936  
   F-rich hydrothermal fluids,  
   865  
   ferrosilicate melt, 1038  
   granitic rocks, oxygen  
   fugacity in, 744  
   K-feldspar, authigenic, 230  
   Kilauea basalts, 273  
   low-temperature alteration in  
   submarine basalt, 1054  
   mantle xenoliths, redox  
   equilibria in, 969  
   mineral triangular plots, 277  
   orthoamphibole, F and Cl in,  
   573  
   oxygen fugacity in granitic  
   rocks, 744  
   palagonitization, 1045  
   paralava, 85  
   redox equilibria in mantle  
   xenoliths, 969  
   REE distribution in anor-  
   thite, 191  
   REEs in apatite, 896  
    $\text{SiO}_2\text{-Y}$  (magadiite), 1147  
   schorl, 1317  
   solubility of Ar in silicate  
   liquid, 513  
   tourmaline, coupled substitu-  
   tion in, 826  
   whole-rock triangular plots,  
   277
- Geothermal systems, 759  
 Geothermometry  
   allanite-bearing magmas, 750  
   apatite saturation, 307  
   Fe-Ti oxides, 101  
   feldspar, 307  
   glass, water speciation in,  
   1247  
   hornblende, 307, 1258  
   muscovite-biotite, 565  
   paralava glasses, 85  
   plagioclase-muscovite, 1258  
   plagioclase-muscovite, 505  
   [erratum]  
   pyroxene, 18, 101, 307, 530  
   subregular model for multi-  
   component solutions, 1016  
   water speciation in glass,  
   1247  
   zircon saturation, 307  
 Germanite, 946  
 Ghana  
   manganooan cummingtonite, 1091  
 Gibbs free energies for man-  
   ganese oxyhydroxides and  
   manganese oxides, 466  
 Gibbs method, 942  
 Glass,  $\text{K}_2\text{Si}_4\text{O}_9$ , 965  
 Glass, water speciation in,  
   1247  
 Glaucophane in blueschist, 960  
 Godlevskite, 1399  
 Goldmanite, 852  
 Goodness-of-fit parameters,  
   685, 688  
 Gordonite, Mn analogue of, 1399  
 Grandite garnet, 151  
 Grandreefite, 927  
 Granite, 307  
 Granitic rocks, oxygen fugacity  
   in, 744  
 Granodiorite, 1258  
 Greece  
   B-bearing K-feldspar, 230  
 Greenalite, 637  
 Greenland  
   apatite, 896  
 Grenvillian crust, 698  
 Grossular, 859  
 Group theory, 151  
 Guidelines for manuscript  
   preparation, 1225  
 Gypsum, 367
- H in humite minerals, 1300  
 H in pyroxene, 1059  
 H in sillimanite, 812  
 H position in phyllosilicates  
   and tremolite, 141  
 Hammarite, 250  
 Harzburgite, 668  
 Hawaii  
   ferrian diopside, 1059  
 Hawthorneite, 668  
 Hectorfloresite, 1207  
 Hedenbergite, 744  
 Hematite, 85, 1233, 1278

- Hercynite, 1278  
 Herschelite, 1337  
 Heteromorphite, 1285  
 Heulandite, 697 [erratum]  
 Hibschie, 840  
 High-pressure phases  
   beta-Mg<sub>2</sub>SiO<sub>4</sub>, 1124  
   glaucofan, 960  
   K<sub>2</sub>Si<sub>4</sub>O<sub>9</sub> glass and liquid, 965  
   MgSiO<sub>3</sub> garnet, 1221  
 High-pressure spectroscopic measurements, 281  
 High-pressure XRD method, 352  
 High-temperature XRD data  
   coronadite, 177  
   romanechite, 177  
   todorokite, 177  
 Hollandite, 177  
 Hornblende, 307, 530, 960, 1258  
   Mg-Fe<sup>2+</sup> and Al-Fe<sup>3+</sup> in, 1097  
   oxidation-dehydrogenation in, 764  
 Hornfels, mafic, 530  
 HRTEM image simulations  
   pyroxene, 1070  
 Humite minerals, H in, 1300  
 Hydrocalumite, 1399  
 Hydromagnesite, 1152  
 Hydrothermal fluid,  
   calc-silicates in, 759  
   F-rich, 865  
 Hydrothermal silica-gel synthesis, 1147  
 Hydroxylapatite, 870  
  
 (Ir,Cu)<sub>2</sub>S<sub>3</sub> mineral, 1215  
 Ir-rich sulfide, 1215  
 Ir-Sb-S mineral, 1215  
 Idaho  
   biotite, 721  
   carpholite, nonstoichiometric, 1084  
   scapolite, 721  
 Igneous petrology  
   alkaline rocks, apatite in, 896  
   anorthosite-syenite-granite association, 307  
   apatite in alkaline rocks, 896  
   basalts, Kilauea, 273  
   carbonatite, 132  
   F in carbonatites, 936  
   gabbro, 101  
   ijolite, metasomatized, 113  
   Kilauea basalts, 273  
   lamproite, 889  
   mafic intrusion, 101  
   magma mixing, 307  
   mantle xenoliths, 969  
   melt rheology, 333  
   metasomatized ijolite, 113  
   minette, 216  
   osumilite + pseudobrookite assemblage, 1278  
   Peninsular Ranges batholith, 1258  
   rhyolite, 865  
   rhyolitic melts and glasses, 1247  
   titanite + magnetite + quartz assemblage, 744  
   Toba Tuffs, 750  
   triangular plots, 277  
   Ijolite, metasomatized, 113  
   Illite/smectite mixed-layer minerals, 1106  
   Ilmenite, 113, 530, 1258  
   Ilmenite-hematite, 160  
   In situ deformation  
     biotite, 780  
     muscovite, 780  
   India  
     kinoshitalite, 200  
   Indiana  
     Salem Limestone, 367  
   Indonesia  
     allanite, 750  
   Interactive least-squares cell-parameter program, 488  
 IR spectroscopy  
   cordierite, 1293  
   fayalite, 281  
   forsterite, 281  
   geigerite, 676  
   glass, water speciation in, 1247  
   hectorfloresite, 1207  
   hibschite, 840  
   library of mineral spectra, 938  
   lipscombite, 456  
   norrishite, 1360  
   pyroxene, 1059  
   siderite-magnesite solid solutions, 187  
   sillimanite, 812  
   titanian andradite, 840  
   tschermakitic hornblende, 764  
   water speciation in glass, 1247  
 Isocubanite, 500  
 Italy  
   andradite, 352  
   herschelite, 1337  
   osumilite, 1278  
   pseudobrookite, 1278  
  
 Jaffeite, 1203  
 Jamesonite, 1285  
 Japan  
   herschelite, 1337  
   hornblende, 1097  
  
 K-feldspar, authigenic, 230  
 K<sub>2</sub>Si<sub>4</sub>O<sub>9</sub> glass and liquid, 965  
 Kadyrelite, 500  
 Kalsilite, 797  
 Karrooite (MgTi<sub>2</sub>O<sub>5</sub>), 902  
 Kharaelakhite, 1215  
 Kilauea basalts, 273  
 Kinetics  
   albite, electron centers in, 1130  
   beryl, reduction of Fe<sup>3+</sup> in, 432  
   Ca-exchanged montmorillonite, 627  
   cation ordering in MgTi<sub>2</sub>O<sub>5</sub>, 902  
   glass, water speciation in, 1247  
   ilmenite-hematite, 160  
   Mg-exchanged montmorillonite, 627  
   MgTi<sub>2</sub>O<sub>5</sub>, cation ordering in, 902  
   phase transition in cordierite, 1293  
   reduction of Fe<sup>3+</sup> in beryl, 432  
   viscous flow, 1038  
   water speciation in glass, 1247  
 Kinoshitalite, 200  
 Kornerupine, 642  
  
 Li<sub>2</sub>CO<sub>3</sub>, 1152  
 Labrador  
   minnesotaite, 384  
   lamproite, 889, 1368  
   Landau theory, 151  
   Laurelite, 927  
   Library of mineral spectra, 938  
   Lindstromite, 250  
   Lipscombite, 456  
   Liquidus relations in  
     Cu<sub>2</sub>S-Sb<sub>2</sub>S<sub>3</sub>, 236  
   Lithiophorite, 466  
   Low-energy electron diffraction  
     galena, 1233  
     hematite, 1233  
   Low-grade rocks, chlorite polytypes in, 738  
   Low-temperature alteration in submarine basalt, 1054  
  
 Mg-exchanged montmorillonite, 627  
 (Mg,Fe<sup>2+</sup>) disorder in Al-rich and Al-poor orthopyroxene, 593  
 (Mg,Ti) in MgTi<sub>2</sub>O<sub>5</sub>, 902  
 MgO-FeO-Fe<sub>2</sub>O<sub>3</sub>-Al<sub>2</sub>O<sub>3</sub>, 339  
 (Mg,Si) in MgSiO<sub>3</sub> garnet, 1221  
 MgSiO<sub>3</sub> garnet, 1221  
 Mg<sub>2</sub>SiO<sub>4</sub>-CaMgSi<sub>2</sub>O<sub>6</sub>-SiO<sub>2</sub>, 1032  
 MgTi<sub>2</sub>O<sub>5</sub>, cation ordering in, 902  
 Mn phosphate, 500  
 MnO-As<sub>2</sub>O<sub>5</sub>-H<sub>2</sub>O, 256  
 Mafic hornfels, 530  
 Mafic intrusion, 101  
 Magadiite, 1147  
   and its potassium analogue, 224  
 Magma mixing, 307  
 Magnesian calcite, 1152  
 Magnesite, 1152  
 Magnetic properties  
   ilmenite-hematite, 160

- Magnetite, 113, 448, 530  
Magnetoplumbite, Fe and Pb in, 1186  
Maine  
  Central Maine synclinorium, 698  
  Chain Lakes massif, 698  
  chlorite, 738  
  Grenvillian crust, 698  
Manganese oxide, 466  
Manganese oxyhydroxide, 466  
Manganooan cummingtonite, 1091  
Mantle  
  MgSiO<sub>3</sub> garnet, 1221  
  xenoliths, redox equilibria in, 969  
Manuscript preparation, guidelines for, 1225  
Marble, forsterite-bearing, 439  
Margarite, 177  
Margarite, 141  
Maricopaite, 946  
Maslovite, 1168  
Mass spectroscopy, 818  
Mawbyite, 1377  
Mechanical properties  
  biotite, 780  
  geigerite, 676  
  muscovite, 780  
  viscosity of diopside melt, 333  
Mediterranean Sea  
  motukoreaite, 1054  
Melilite, 85  
Melt rheology, 333  
Melt structure  
  effect of pressure, 965  
  Fe-bearing aluminosilicate melt, 58  
  glass, water speciation in, 1247  
  K<sub>2</sub>Si<sub>4</sub>O<sub>9</sub> glass, 965  
  polymerization in silicate melt, 333  
  related to viscosity and composition, 1038  
  silicate melts, polymerization in, 333  
  silicate melts at high pressure, 513  
  water speciation in glass, 1247  
Melting in NaAlSi<sub>3</sub>O<sub>8</sub>-C-O-H, 50  
Memorials  
  Campbell, Charles D., 944  
  Donnay, Gabrielle, 491  
  Garrels, Robert Minard, 497  
  Nowacki, Werner, 1394  
  Permingeat, Francois, 692  
  Roberts, Willard Lincoln, 1397  
  Scheid, Vernon Edward, 494  
  Weeks, Alice Mary Dowse, 694  
Mesozoic crustal extension, 698  
Metamorphic petrology  
  ACF, AKF, AFM (Eskola) plots, 277  
  Cl-F in metamorphic fluid, 721  
  calculation of P-T paths, 942  
  chlorite polytypes in low-grade rocks, 738  
  chloritoid isograd, 549  
  contact metamorphism, 530  
  five-amphibole assemblage, 960  
  fluid-rock interaction, 721  
  forsterite-bearing marble, 439  
  garnet + hornblende + plagioclase + quartz geobarometer, 77  
  low-grade rocks, chlorite polytypes in, 738  
  orthoamphibole-bearing assemblages, 573  
  paralava (pyrometamorphism), 85  
  pelitic schist, 565  
  reaction-progress variable, 530  
  reaction space, 530  
  Metapelite, 549  
  Metasomatized harzburgite, 668  
  Metasomatized ijolite, 113  
  Meteorites, corrosion of Fe-Ni in, 656  
  Mexico  
    analcime, 216  
    boulangerite, 1285  
    jamesonite, 1285  
  Miargyrite, Se analogue of, 946  
  Mica, 132, 1106  
    Tschermak's components in, 565  
    See also individual micas  
  Mid-Atlantic Ridge  
    palagonite, 1045  
  Mineral database, 940  
  "Mineral MK," 946  
  Mineral triangular plots, 277  
  Mineralogical Society of America Award  
    acceptance of, 720  
    presentation of, 719  
  Minette, 216  
  Minnesotaite, 384  
  Modulated structure, nosean, 394  
  Molar volume of Ar in liquids, 513  
  Molecular orbital calculations of sulfide molecules and sulfides, 620  
  Monosulfide solid solution, 981  
  Montana  
    schorl, 422, 1317  
  Montmorillonite, 627  
  Monzonite, 1270  
  Monzosyenite, 307  
  Morocco  
    coronadite, 913  
  Mossbauer spectroscopy  
    alkali-deficient schorl, 1317  
    ankerite, 1159  
    calcic amphibole, 360  
    clinopyroxene, 969  
    ferrian diopside, 1059  
    ferroan dolomite, 1159  
    lipscombite, 456  
    olivine, 969  
    orthopyroxene, 969  
    quenched Fe-bearing aluminosilicate melts, 58  
    schorl, 1317  
    spectral fitting, 685, 688  
    spinel, 969  
    staurolite, 610  
  Motukoreaite, 1054  
  Mounting technique for particulate samples, 271  
  Mullite, 85  
  Multicomponent systems and phases, 1016  
  Munirite, 1399  
  Muscovite, 780, 1258  
    (Al,Si) in, 141  
  Muscovite-biotite, 565  
  NaAlSi<sub>3</sub>O<sub>8</sub>-C-O-H, 50  
  Na<sub>2</sub>O-SiO<sub>2</sub>-H<sub>2</sub>O, 1147  
  [Na<sub>4</sub>·SO<sub>4</sub>] and [Na<sub>4</sub>·H<sub>2</sub>O] clusters in nosean, 394  
  Ni in olivine, 981  
  Ni-Mg olivine, 411, 1412 [erratum]  
  Namibia  
    agate, 476  
    jaffeite, 1203  
    wiserite, 1351, 1374  
  Natrolite, 113  
  Neltnerite, 1325  
  Nepheline, 85, 113  
  Neutron diffraction  
    hibschite, 840  
    renierite, 1177, 1412 [erratum]  
  Nevada  
    pyrophyllite, 1405  
  New Jersey  
    baumite, 637  
    sclarite, 1355  
  New Mexico  
    coffinite, 263  
    spinel lherzolite, 969  
  New mineral data (abstracts)  
    bursaitite, 1399  
    cannizzarite, 1399  
    crookesite, 1399  
    drugmanite, 946  
    dumontite, 1399  
    ehrleite, 500  
    eskebornite, 1399  
    germanite, 946  
    godlevskite, 1399  
    hydrocalumite, 1399  
    munirite, 1399  
    palarstanide, 1215  
    prassoite, 1215  
    ramsbeckite, 500  
    robertsite, 1399

- roggianite, 500  
 rostite, 946  
 sabatierite, 1399  
 sigloite, 1399  
 tinticite, 1399  
 uranophane, 500  
 xingzhongite, 1215  
 xitiesshanite, 1399  
 See also Unnamed minerals
- New minerals (abstracts)  
 abhurite, 500  
 bazhenovite, 500  
 beta-iridisite, 1215  
 blatterite, 1399  
 bowieite, 1215  
 brokenhillite, 1399  
 cesplumtantite, 500  
 cetineite, 1399  
 chekhovichite, 1399  
 chernikovite, 1399  
 chvilevaite, 946  
 cobaltaustinite, 500  
 ecandrewsite, 500  
 fahleite, 500  
 fergusonite-(Ce), 946  
 fergusonite-(Nd), 946  
 ferristrunzite, 500  
 fluorellestadite, 500  
 isocubanite, 500  
 kadyrelite, 500  
 kharaelakhite, 1215  
 maricopaite, 946  
 pottsite, 500  
 roxybite, 946  
 sieleckiite, 1399  
 skippenite, 946  
 sulrhodite, 1215  
 watkinsonite, 946  
 zharchikhite, 500  
 See also Unnamed Minerals
- New minerals (descriptions)  
 aravaipaite, 927  
 chayesite, 1368  
 geigerite, 676  
 grandreefite, 927  
 hawthorneite, 668  
 hectorfloresite, 1207  
 jaffeite, 1203  
 laurelite, 927  
 mawbyite, 1377  
 norrishite, 1360  
 pinalite, 934  
 pseudograndreefite, 927  
 sclarite, 1355
- New South Wales  
 coronadite, 913  
 mawbyite, 1377
- New Zealand  
 epidote, 759  
 prehnite, 759  
 pyrope, 352  
 wairakite, 759
- Nitrate deposits, 1207
- NMR spectroscopy  
<sup>27</sup>Al in 2:1 clay minerals, 203  
 alkali carbonates, 1152  
 aragonite, 1152  
 Cs<sub>2</sub>CO<sub>3</sub>, 1152  
 calcite, 1152  
 cerussite, 1152  
 dolomite, 1152  
 gamma-Na<sub>2</sub>CO<sub>3</sub>, 1152  
 K<sub>2</sub>Si<sub>4</sub>O<sub>9</sub> glass, 965  
 Li<sub>2</sub>CO<sub>3</sub>, 1152  
 magnesian calcite, 1152  
 magnesite, 1152  
 pyrophyllite and pyrophyllite dehydroxylate, 1405  
 quartz, 956  
 vaterite, 1152  
 Norbergite, 1300  
 Norrishite, 1360  
 North Carolina, staurolite, 610  
 Norway  
 Ba-Ti - rich phlogopite, 439  
 clin amphibole, 586  
 Nosean, [Na<sub>4</sub>·SO<sub>4</sub>] and [Na<sub>4</sub>·H<sub>2</sub>O] clusters in, 394  
 Nowacki, Werner, Memorial of, 1394  
 Nsutite, 466
- 18O in analcime, 216  
 OH in pyroxene, 1059  
 Officers of MSA  
 Former officers and meeting places, list of, 1420  
 Officers and committees for 1989, 1423
- Olivine, 85, 101, 307, 530, 969, 981, 994  
 geobarometry, 18  
 solid-solution model, 37  
 synthetic, 37  
 with Ni-Mg, 411, 1412 [erratum]  
 See also individual olivines  
 Olivine + pyroxene + quartz, 18  
 Olivine + supercritical aqueous chlorides, 37
- Omphacite, 1287
- Ontario  
 barite, 1270  
 celestine, 1270
- Opal, 821
- Optical properties  
 andradite (anisotropic), 1307  
 aravaipaite, 927  
 chayesite, 1368  
 chromian spinel, 448  
 geigerite, 676  
 grandreefite, 927  
 grossular, 859  
 hawthorneite, 668  
 hectorfloresite, 1207  
 herschelite, 1337  
 jaffeite, 1203  
 kinoshitalite, 200  
 laurelite, 927  
 motukoreaite, 1054  
 norrishite, 1360  
 palagonite, 1045  
 phlogopite, 132  
 pinalite, 934  
 pseudograndreefite, 927  
 sclarite, 1355  
 staurolite, 610  
 vanadinite, 1182  
 wiserite, 1374
- Optical spectroscopy  
 beryl, 432  
 Eu<sup>3+</sup> in anorthite, 191  
 ferrian diopside, 1059  
 norrishite, 1360
- Order-disorder  
 (Al,Si) in albite, 1130  
 (Al,Si) in herschelite, 1337  
 (Al,Si) in muscovite, 141  
 aikinite, 250  
 albite, 482, 484, 1130  
 albite, Fe<sup>3+</sup> in, 604  
 alleghanyite, 1300  
 ankerite, 1159  
 chondrodite, 1300  
 cummingtonite, Mn-Mg in, 1091  
 Fe in magnetoplumbite, 1186  
 Fe<sup>3+</sup> in albite, 604  
 (Fe<sup>3+</sup>,Al) in andradite, 1307  
 (Fe,Mg) in calcic amphibole, 360  
 (Fe<sup>2+</sup>,Mg)(Fe<sup>3+</sup>,Al)<sub>2</sub>O<sub>4</sub> spinels, 1000  
 Fe<sub>3</sub>O<sub>4</sub>-FeAl<sub>2</sub>O<sub>4</sub>, 339  
 Fe<sub>3</sub>O<sub>4</sub>-MgAl<sub>2</sub>O<sub>4</sub>, 339  
 Fe<sub>3</sub>O<sub>4</sub>-MgFe<sub>2</sub>O<sub>4</sub>, 339  
 ferroan dolomite, 1159  
 friedrichite, 250  
 grandite garnet, 151  
 grossular, 859  
 hammarite, 250  
 hibschite, 840  
 hornblende, (Mg,Fe<sup>2+</sup>) and (Al,Fe<sup>3+</sup>) in, 1097  
 ilmenite-hematite, 160  
 kornerupine, 642  
 lindstromite, 250  
 (Mg,Fe<sup>2+</sup>) disorder in Al-rich and Al-poor orthopyroxene, 593  
 (Mg,Si) in MgSiO<sub>3</sub> garnet, 1221  
 (Mg,Ti) in MgTi<sub>2</sub>O<sub>5</sub>, 902  
 magnetoplumbite, Fe and Pb in, 1186  
 muscovite, (Al,Si) in, 141  
 [Na<sub>4</sub>·SO<sub>4</sub>] and [Na<sub>4</sub>·H<sub>2</sub>O] clusters in nosean, 394  
 Ni-Mg olivine, 411, 1412 [erratum]  
 norbergite, 1300  
 Pb in magnetoplumbite, 1186  
 phase transition in cordierite, 1293  
 sulfosalts of Ag with As, Sb, and Bi, 243  
 titanian clinohumite, 1300  
 Orthoamphibole, F and Cl in, 573  
 Orthoamphibole-biotite pairs, 573

- Orthopyroxene, 85, 593, 969, 981, 1070
- Osumilite + pseudobrookite assemblage, 1278
- Oxidation-dehydrogenation in hornblende, 764
- Oxygen fugacity in granitic rocks, 744
- Oxygen isotopes in agate, quartz, and chalcedony, 476
- Pb in magnetoplumbite, 1186
- Pb-Bi-Hg-Cu sulfosalts, 1399
- PbTe<sub>2</sub> mineral, 946
- Pb<sub>2</sub>Te<sub>3</sub> mineral, 946
- Pb<sub>2</sub>TeS mineral, 946
- Pd minerals, 1215
- Pt-Cu-Fe minerals, 1215
- Pt-group minerals, 1215
- Pahasapaite, 1195
- Palagonite, 1045
- Palarstanide, 1215
- Paragonite, 549
- Paralava (pyrometamorphism), 85
- Parau Island  
pargasite, 1097
- Pargasite, 1097
- Particulate-sample mounting technique, 271
- Partitioning between low-Ca pyroxene and melt, 31
- Pearce element-ratio diagram, 273
- Pelitic schist, 565
- Peninsular Ranges batholith, 1258
- Penroseite, 1168
- Pentlandite, 981
- Permingeat, Francois, Memorial of, 692
- Perovskite, 113
- Phase diagrams, computer calculation of, 485
- Phase equilibria  
albite, solidus of, 513  
annite - quartz - K-feldspar - fayalite - H<sub>2</sub>O, 307  
anorthite, solidus of, 513  
biotite-fluid, 721  
Ca-exchanged montmorillonite, 627  
CaCO<sub>3</sub>-CaSO<sub>4</sub>-Ca(NO<sub>3</sub>)<sub>2</sub>-H<sub>2</sub>O, 367  
CaCO<sub>3</sub>-CaSO<sub>4</sub>-H<sub>2</sub>O, 367  
calc-silicates in hydrothermal fluids, 759  
diopside, solidus of, 513  
diopside-tridymite boundary line, 1032  
enstatite-diopside join, 325  
Fe-bearing aluminosilicate melts, 58  
Fe-Mg exchange between garnet and olivine, 994  
garnet + hornblende + plagioclase + quartz, 77  
Gibbs method, 942  
hydrothermal fluids, calc-silicates in, 759  
illite, 1106  
melting in NaAlSi<sub>3</sub>O<sub>8</sub>-C-O-H, 50  
Mg-exchanged montmorillonite, 627  
mica, 565, 1106  
monosulfide solid solution, 981  
montmorillonite, 627  
olivine + supercritical aqueous solution, 37  
orthoamphibole-biotite pairs, 573  
paralava, 85  
pentlandite, 981  
phase diagrams, computer calculation of, 485  
phlogopite, 1  
pyrite, 981  
pyroxene-olivine-quartz in CMFS system, 18  
pyrrhotite, 981  
quartz-ulvospinel-ilmenite-fayalite (QUIIF), 307  
sanidine, solidus of, 513  
scapolite-plagioclase-fluid, 721  
skinnerite-tetrahedrite liquidus phase relations, 236  
smectite, 1106  
titanite-hedenbergite stability, 744  
tourmaline, 826  
Tschermak's components in mica, 565  
violarite, 981  
volatiles at high pressure, 1383
- Phase transition in cordierite, 1293
- Phlogopite, 1, 132
- Ba-Ti - rich, 439
- Photoconductivity  
boulangerite, 1285  
heteromorphite, 1285  
jamesonite, 1285
- Phyllomanganate structures, 1386
- Pigeonite, 307, 1070
- Pinakolite-group mineral, 1399
- Pinalite, 934
- Plagioclase, 101, 530, 565, 586  
See also individual plagioclases
- Plagioclase-muscovite, 1258
- Plagioclase-muscovite thermometer [erratum], 505
- Poland  
zincian dolomite, 461
- Polymerization in silicate melts, 333
- Potassium silicate, 224
- Pottsite, 500
- Prassoite, 1215
- Prehnite, 759
- Presidential Address for 1988, 698
- Proceedings for 1988, 1413
- Professional publications, 689
- Protoastrakanite (= konyaite), 1382
- Protonation in beta-Mg<sub>2</sub>SiO<sub>4</sub>, 1124
- Proustite, 243
- Pseudobrookite, 85, 1278
- Pseudograndreefite, 927
- Pyrite, 981  
anisotropic, 1168
- Pyrite-group minerals, 1168
- Pyrolusite, 177
- Pyrometamorphism, 85
- Pyrope at high pressure, 352
- Pyrophyllite, 141, 1405
- Pyrophyllite dehydroxylate, 1405
- Pyroxene, 101, 113, 307, 530, 1070  
OH in, 1059  
See also individual pyroxenes
- Pyroxene geobarometry, 18
- Pyroxene geothermometry, 18
- Pyroxene-olivine-quartz in CMFS system, 18
- Pyrrhotite, 981
- Quantum mechanical calculations  
sulfide molecules and sulfides, 620
- Quartz, 956  
oxygen isotopes in, 476
- Quartz syenite, 307
- Quartz-ulvospinel-ilmenite-fayalite (QUIIF), 307
- Quebec - Maine - Gulf of Maine Transect, 698
- Quebec  
grossular, 859
- Quenched Fe-bearing aluminosilicate melts, 58
- Rh-Ni-Sb mineral, 1215
- Rh-Sb-S mineral, 1215
- Raman spectroscopy  
BaCuSi<sub>2</sub>O<sub>6</sub> (synthetic), 952  
mounting technique for particulate samples, 271  
particulate-sample mounting technique, 271
- Ramsbeckite, 500
- Rare-earth elements  
allanite, 750  
apatite, 896  
coffinite, 263  
Eu<sup>3+</sup> in anorthite, 191  
ijolite, 113
- Reaction-progress variable, 530
- Reaction space, 530
- Redox equilibria in mantle xenoliths, 969
- Reduction of Fe<sup>3+</sup> in beryl, 432
- REEs  
in anorthite, 191

- in apatite, 896  
 Renierite, 1177, 1412 [erratum]  
 Reports for 1988  
   Editor, 1417  
   Financial Advisory Committee, 1417  
   Secretary, 1413  
   Treasurer, 1414  
 Reviewers for American Mineralogist in 1988, 1419  
 Rhyolite, 865  
 Rhyolitic melts and glasses, 1247  
 Roberts, Willard Lincoln, Memorial of, 1397  
 Robertsite, 1399  
 Roebing Medal  
   acceptance of, 717  
   presentation of, 715  
 Roggianite, 500  
 Romanechite, 177  
 Rostite, 946  
 Roxbyite, 946  
  
 Sb-Cu alloy, 236  
 Sc, 31  
 SiO<sub>2</sub>-Y (magadiite), 1147  
 Sabatierite, 1399  
 Salem Limestone, 367  
 Sanidine, solidus of, 513  
 Saudi Arabia  
   spinel lherzolite, 969  
 Scanning tunneling microscopy  
   galena, 1233  
   hematite, 1233  
 Scapolite, 721  
 Scapolite-plagioclase-fluid, 721  
 Scheid, Vernon Edward, Memorial of, 494  
 Schorl, 422, 1317  
 Sclerite, 1355  
 Secretary, 1988 Report of the, 1413  
 Serpentine, 141  
 Shear viscosities of silicate melt, 1038  
 Shelburne Marble, 367  
 Siderite-magnesite solid solutions, 187  
 Sieleckiite, 1399  
 Sigloite, 1399  
 Silicate melt  
   at high pressure, 513  
   polymerization in, 333  
   shear viscosities of, 1038  
 Silicate rings, four-membered, 952  
 Silicic acids (crystalline), 224  
 Sillimanite, H in, 812  
 Skinnerite-tetrahedrite liquidus phase relations, 236  
 Skippenite, 946  
 Smectite, 1106. See also Illite/smectite  
 Smithite, 243  
  
 Software notices  
   calculation of phase diagrams, 485  
   fluid-inclusion data reduction, 1390  
   generalized Gibbs method algorithm, 942  
   interactive least-squares cell-parameter program, 488  
   mineral database, 940  
   Pearce element-ratio diagram, 273  
   triangular diagrams, 277  
 Solid-solution modeling, 1016  
 Solubility of Ar in silicate liquids, 513  
 Solution model  
   thermodynamic theory, 14  
   Wohl's asymmetric, 14  
 South Africa  
   metasomatized harzburgite, 668  
   todorokite, 177  
 South Australia  
   opal, 821  
 South Dakota  
   pahasapaite, 1195  
 Spain  
   chayesite, 1368  
   chlorite, 1113  
 Spectral fitting, 685, 688  
 Spectroscopic measurements, high-pressure, 281  
 Sphe ( = titanite), 113  
   and hedenbergite stability, 744  
 Spinel, 85, 969  
   solid solutions, conductivity and thermopower measurements in, 339  
 Spinel lherzolite, 969  
 Stable isotopes  
   agate, oxygen isotopes in, 476  
   barite, 1270  
   celestine, 1270  
   chalcedony, oxygen isotopes in, 476  
   <sup>18</sup>O in analcime, 216  
   quartz, oxygen isotopes in, 476  
 Stacking irregularities in chlorite, 1113  
 Staurolite, 610  
 Stilpnomelane, 549  
 Structural complexity, 918  
 Structure-energy calculations  
   alleganyite, 1300  
   chlorite, 141  
   chondrodite, 1300  
   clintonite, 141  
   configurational energy, 484  
   configurational entropy, 482  
   diopside, 774  
   H position in phyllosilicates and tremolite, 141  
   margarite, 141  
   muscovite, 141  
   Ni-Mg olivine, 411, 1412 [erratum]  
   norbergite, 1300  
   pyrophyllite, 141  
   serpentine, 141  
   talc, 141  
   titanian clinohumite, 1300  
   tremolite, 141  
 Subregular model for multicomponent solutions, 1016  
 Sulfide molecules and sulfides, molecular orbital calculations of, 620  
 Sulfosalts of Ag with As, Sb, and Bi, 243  
 Sulrhodite, 1215  
 Sverigeite, 1343  
 Sweden  
   akrochordite, 256  
   chromian spinel, 448  
   orthoamphibole-biotite rocks, 573  
   sverigeite, 1343  
 Switzerland  
   geigerite, 676  
 Syenite, 1270  
 Systems (chemical)  
   Ag<sub>2</sub>S-As<sub>2</sub>S<sub>3</sub>, 243  
   Ag<sub>2</sub>S-Bi<sub>2</sub>S<sub>3</sub>, 243  
   Ag<sub>2</sub>S-Sb<sub>2</sub>S<sub>3</sub>, 243  
   Bi<sub>2</sub>S<sub>3</sub>-CuPbBiS<sub>3</sub>, 250  
   CaCO<sub>3</sub>-CaSO<sub>4</sub>-Ca(NO<sub>3</sub>)<sub>2</sub>-H<sub>2</sub>O, 367  
   CaCO<sub>3</sub>-CaSO<sub>4</sub>-H<sub>2</sub>O, 367  
   CaCO<sub>3</sub>-MgCO<sub>3</sub>-FeCO<sub>3</sub>, 1159  
   CaMg(CO<sub>3</sub>)<sub>2</sub>-CaZn(CO<sub>3</sub>)<sub>2</sub>-Ca(Fe,Mn)(CO<sub>3</sub>)<sub>2</sub>, 461  
   CaO-MgO-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>, 325  
   CaO-SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-FeO-H<sub>2</sub>O, 759  
   Cu<sub>2</sub>S-Sb<sub>2</sub>S<sub>3</sub>, 236  
   Fe<sub>3</sub>O<sub>4</sub>-FeCr<sub>2</sub>O<sub>4</sub>-Mg<sub>0.7</sub>Fe<sub>0.3</sub>Al<sub>2</sub>O<sub>4</sub>, 448  
   K<sub>2</sub>O-SiO<sub>4</sub>, 965  
   MgO-FeO-Fe<sub>2</sub>O<sub>3</sub>-Al<sub>2</sub>O<sub>3</sub>, 339  
   Mg<sub>2</sub>SiO<sub>4</sub>-CaMgSi<sub>2</sub>O<sub>6</sub>-SiO<sub>2</sub>, 1032  
   MnO-As<sub>2</sub>O<sub>5</sub>-H<sub>2</sub>O, 256  
   NaAlSi<sub>3</sub>O<sub>8</sub>-C-O-H, 50  
   Na<sub>2</sub>O-SiO<sub>2</sub>-H<sub>2</sub>O, 1147  
  
 Ti-Al-Zr oxide, 946  
 Tl sulfide, 1399  
 Talc, 141  
 Tanzania  
   kornerupine, 642  
 Technique for welding Ag containers, 1385  
 Texas  
   rhyolite, 865  
   zircon, 865  
 TGA. See DTA  
 Thermodynamic data  
   andradite, 744  
   apatite solid solutions, 877  
   birnessite, 466  
   Ca-exchanged montmorillonite, 627

- Thermodynamic data--continued  
 chlorapatite, 877  
 cryptomelane, 466  
 enthalpies of disordering of  $\text{Fe}^{2+}$ - $\text{Fe}^{3+}$ ,  $\text{Mg}$ - $\text{Fe}^{3+}$ ,  $\text{Fe}^{2+}$ -Al, and  $\text{Mg}$ -Al in spinels, 339  
 enthalpies of formation of trechmannite, smithite, and proustite, 243  
 enthalpy of solution of Ar in liquids, 513  
 entropy-volume relations, review of, 5  
 estimation of  $\Delta G_f^\circ$  and  $\Delta H_f^\circ$  for silicates, 1023  
 Fe-Mg exchange between garnet and olivine, 994  
 $(\text{Fe}^{2+}, \text{Mg})(\text{Fe}^{3+}, \text{Al})_2\text{O}_4$  spinels, 1000  
 glass, water speciation in, 1247  
 hedenbergite, 744  
 heulandite, 697 [erratum]  
 karrooite ( $\text{MgTi}_2\text{O}_5$ ), 902  
 lithiophorite, 466  
 Mg-exchanged montmorillonite, 627  
 molar volume of Ar in liquids, 513  
 nsutite, 466  
 olivine solid-solution model, 37  
 plagioclase-muscovite thermometer, 505 [erratum]  
 proustite, 243  
 pyroxene-olivine-quartz in CMFS system, 18  
 smithite, 243  
 spinels, 339  
 subregular model for multi-component solutions, 1016  
 titanite, 744  
 trechmannite, 243  
 water speciation in glass, 1247  
 zeolite, 697 [erratum]
- Thermodynamic theory, solution model, 14
- Thermopower measurements in spinel solid solutions, 339
- Tinticite, 1399
- Titanian andradite, 840
- Titanian clinohumite, 1300
- Titanite + magnetite + quartz assemblage, 744
- Titanomagnetite, 1278
- Toba Tuffs, 750
- Todorokite, 177
- Tolovkite, 1168
- Tourmaline  
 coupled substitution in, 826  
 structural relationships, 422
- Trace elements  
 $\text{Eu}^{3+}$  in anorthite, 191  
 fine-grained tuff and tuffite, 230  
 H in pyroxene, 1059  
 H in sillimanite, 812  
 Ni in olivine, 981  
 partitioning at high pressure, 31  
 partitioning between low-Ca pyroxene and melt, 31  
 Sc, 31  
 triangular plots, 277  
 V in garnet, 852  
 Yb, 31  
 zircon, 865
- Treasurer, 1988 Report of the, 1414
- Trechmannite, 243
- Tremolite, 141
- Triangular diagrams, 277
- Triangular plots (ACF, AKF, AFM), 277
- Tschermak's components in mica, 565
- Tschermakititic hornblende, 764
- Tsumcorite, 1377
- Tuff and tuffite, 230
- Turkey  
 vanadinite, 1182
- Tvalchrelidzeite, As analogue of, 946
- Two-phase monosulfide solid solution, 981
- Unit-cell data (surface)  
 galena, 1233  
 hematite, 1233
- Unit-cell data  
 akrochordite, 256  
 albite, 604  
 amphibole, calcic, 360  
 analcime, 216  
 andradite, 1307  
 ankerite, 1159  
 aravaipaite, 927  
 $\text{BaCuSi}_2\text{O}_6$  (synthetic), 952  
 $\text{Cr}^{2+}$ -bearing enstatite, 599  
 calcic amphibole, 360  
 calcite, 1152  
 carminite, 1377  
 carpholite, nonstoichiometric, 1084  
 chayesite, 1368  
 coffinite, 263  
 coronadite, 913  
 dolomite, 1152  
 enstatite,  $\text{Cr}^{2+}$ -bearing, 599  
 ferroan dolomite, 1159  
 garnet, 994  
 geigerite, 676  
 goldmanite, 852  
 grandreefite, 927  
 hawthorneite, 668  
 hectorfloresite, 1207  
 hibschite, 840  
 hornblende, 764, 1097  
 jaffeite, 1203  
 kalsilite, 797  
 karrooite ( $\text{MgTi}_2\text{O}_5$ ), 902  
 kornerupine, 642  
 laurelite, 927  
 lipscombite, 456  
 magnesite calcite, 1152  
 magnetoplumbite, 1186  
 manganoan cummingtonite, 1091  
 mawbyite, 1377  
 monosulfide solid solution, 981  
 norrishite, 1360  
 orthopyroxene, 593  
 osumilite, 1278  
 pahasapaite, 1195  
 pargasite, 1097  
 pinalite, 934  
 pseudobrookite, 1278  
 pseudograndreefite, 927  
 schorl, 422  
 sclearite, 1355  
 staurolite, 610  
 titanian andradite, 840  
 todorokite, 177  
 tschermakititic hornblende, 764  
 tsumcorite, 1377  
 wiserite, 1374
- Unnamed minerals  
 $\text{AgBi}_2\text{Te}_4$  mineral, 946  
 $\text{Ag}_2\text{Pb}_{13.5}\text{Bi}_9\text{S}_{28}$  mineral, 946  
 Au-Bi sulfide, 946  
 $\text{Au}_3\text{Hg}$ , 500  
 arsenate, 1399  
 Ba-Ti - rich phlogopite, 439  
 Bi selenides, 946  
 $\text{Bi}_3(\text{Se}, \text{S})_2$  mineral, 946  
 Cr-bearing aluminohydroxcalcite, 946  
 $(\text{Cu}, \text{Ag})_{3-x}(\text{Bi}, \text{Pb})_{7+x}(\text{S}, \text{Sc})_{12}$ , 946  
 $\text{CuAg}_3\text{Pb}_{13}\text{Sb}_{17}\text{S}_{40}$  mineral, 946  
 crichtonite-group mineral, 1399  
 gordonite, Mn analogue of, 1399  
 $(\text{Ir}, \text{Cu})_2\text{S}_3$  mineral, 1215  
 Ir-rich sulfide, 1215  
 Ir-Sb-S mineral, 1215  
 Mn phosphate, 500  
 miargyrite, Se analogue of, 946  
 "mineral MK," 946  
 modulated layer silicate in "baumite," 637  
 Pb-Bi-Hg-Cu sulfosalts, 1399  
 $\text{PbTe}_2$  mineral, 946  
 $\text{Pb}_2\text{Te}_3$  mineral, 946  
 $\text{Pb}_2\text{TeS}$  mineral, 946  
 Pd minerals, 1215  
 Pt-Cu-Fe minerals, 1215  
 Pt-group minerals, 1215  
 pinakiolite-group mineral, 1399  
 Rh-Ni-Sb mineral, 1215  
 Rh-Sb-S mineral, 1215  
 Ti-Al-Zr oxide, 946  
 Tl sulfide, 1399  
 tvalchrelidzeite, As analogue of, 946

- Unnamed minerals--continued  
   WC mineral, 946  
 Uranophane, 500  
 USSR  
   aikinite, 250  
 Utah  
   chayesite, 1368  
   lamproite, 1368  
  
 V-bearing calcareous  
   metapelites, 852  
 V-bearing skarns, 852  
 V in garnet, 852  
 Vaesite, 1168  
 Vanadian amphibole, 852  
 Vanadian diopside, 852  
 Vanadian grossular, 852  
 Vanadinite, 1182  
 Vaterite, 1152  
 Vector representation of com-  
   positions, 826  
 Vermont  
   blueschist, 960  
   metapelites, 549  
   Shelburne Marble, 367  
 Villamaninite, 1168  
 Violarite, 981  
 Virginia  
   albite, 604, 1130  
 Viscosity  
   of diopside melt, 333  
   related to composition, 1038  
 Viscous flow, 1038  
 Volatiles at high pressure,  
   1383  
 Voronoi polyhedra, 918  
  
 WC mineral, 946  
 Wairakite, 759  
 Water speciation in glass, 1247  
 Watkinsonite, 946  
 Weeks, Alice Mary Dowse,  
   Memorial of, 694  
 Welding technique for Ag con-  
   tainers, 1385  
  
 Western Australia  
   apatite, 889  
   lamproite, 889  
 Whole-rock triangular plots,  
   277  
 Winchite, 960  
 Wiserite, 1351, 1374  
 Wohl's asymmetric solution  
   model, 14  
 Wyoming  
   anorthosite, 307, 1070  
   biotite gabbro, 307  
   clinker, 85  
   ferrodiorite, 307  
   ferromonzonite, 307  
   granite, 307  
   mafic hornfels, 530  
   monzosyenite, 307  
   paralava, 85  
   pyroxene, 1070  
   quartz syenite, 307  
  
 Xingzhongite, 1215  
 Xitieshanite, 1399  
 XRD data  
   akrochordite, 256  
   andradite, 1307  
   aravaipaite, 927  
   B-bearing authigenic K-  
     feldspar, 230  
   calcite, 1152  
   cordierite, synchrotron  
     powder-diffraction study  
     of, 1293  
   coronadite, 177, 913  
   dolomite, 1152  
   geigerite, 676  
   grandreefite, 927  
   hawthorneite, 668  
   hectorfloresite, 1207  
   hydromagnesite, 1152  
   interactive least-squares  
     cell-parameter program,  
     488  
   jaffeite, 1203  
  
 kalsilite, 797  
 laurelite, 927  
 lipscombite, 456  
 magnesian calcite, 1152  
 manganese cummingtonite,  
   1091  
 mawbyite, 1377  
 modulated layer silicate in  
   "baumite," 637  
 motukoreaite, 1054  
 Ni-Mg olivine, 411, 1412  
   [erratum]  
 norrishite, 1360  
 orthopyroxene, 593  
 pahasapaite, 1195  
 palagonite, 1045  
 pinalite, 934  
 plagioclase, 101  
 potassium silicate, 224  
 pseudograndreefite, 927  
 pyrophyllite and pyrophyllite  
   dehydroxylate, 1405  
 romanechite, 177  
 SiO<sub>2</sub>-Y (magadiite), 1147  
 sclarite, 1355  
 todorokite, 177  
  
 XRF data  
   anorthosites and associated  
     rocks, 307  
   clinker, 85  
   paralava, 85  
  
 Yb, 31  
  
 Zaire  
   renierite, 1177, 1412 [er-  
     ratum]  
 Zeolite  
   heulandite, 697 [erratum]  
   See also individual zeolites  
 Zharchikhite, 500  
 Zincian carbonate, 461  
 Zincian dolomite, 461  
 Zircon, 865  
 Zircon saturation, 307