

# THE CANADIAN MINERALOGIST

## VOLUME 27, INDEX

J. DOUGLAS SCOTT

*Kidd Creek Division of Falconbridge Limited, P.O. Box 2002, Timmins, Ontario P4N 7K1*

### AUTHOR INDEX

- Andrews, M.S. & Ripley, E.M. Mass transfer and sulfur fixation in the contact aureole of the Duluth Complex, Dunka Road Cu-Ni deposit, Minnesota, 293
- Antenucci, D. & Bourguignon, P. Caractérisation du bitume du massif calcaire de Visé (Belgique) et comparaison avec des anthraxolites nord-américaines, 525
- Atencio, D. with Coimbra, A.M., 119
- Baird, A.K. with Wadsworth, W.B., 323
- Barrett, T.J. with Fralick, P.W., 601
- Basso, R. with Merlini, S., 625
- Beny, C. with Robert, Y.-L., 225
- Bonin, J.-M. with Robert, J.-L., 225
- Birrell, R.W. with Howell, J.B., 401
- Bonardi, M. with Robert, A.C., 129
- Boulegue, J. with Jedwab, 121
- Bourguignon, P. with Antenucci, D., 525
- Bowman, J.R. with Gerstner, M.R., 545
- Brill, B.A. Trace-element contents and partitioning of elements in ore minerals from the CSA Cu-Pb-Zn deposit, Australia, and implications for ore genesis, 19
- Brisbin, W.C. with Mandziuk, W.S., 81
- Bristol, C.C. & Froese, E. Highly metamorphosed altered rocks associated with the Osborne Lake volcanogenetic massive sulfide deposit, Snow Lake area, Manitoba, 593
- Buseck, P.R. with Cabri, L.J., 353
- Buseck, P.R. with Hassan, I., 173
- Cabri, L.J. Chrysocolla, S.L., De Villiers, J.P.R., Laflamme, J.H.G. & Buseck, P.R. The nature of "invisible" gold in arsenopyrite, 353
- Cavallo, G.J. X-ray investigation of "mountain leather", 237
- Chao, G.Y. with van Vothuizen, J., 125
- Chen, T.T. with Paar, W.H., 257
- Cheng, W. & Greenwood, H.J. The stability of the assemblage olivine + diopside, 657
- Chernosky, J.V. with O'Hanley, D.S., 483
- Chrysocolla, S. with Cabri, L.J., 353
- Coimbra, A.M., Coutinho, J.M.V., Atencio, D. & Iwanuch, W. Lanthanum-(Nd) from Santa Isabel, state of São Paulo: second Brazilian and world occurrence, 119
- Cook, R.B. with Foord, P.E., 93
- Coutinho, J.M.V. with Coimbra, A.M., 119
- Couty, R. with Manier-Clavina, V., 663
- Criddle, A.J. with Harris, D.C., 427
- Criddle, A.J. with Paar, W.H., 257
- Dai, Y. & Hughes, J.M. Crystal-structure refinements of vanadinite and pyromorphite, 189
- Deliens, M. with Piret, P., 533
- De Villiers, J.P.R. with Cabri, L.J., 353
- Doern, D.C. with Vance, E.M., 495
- Droop, G.T.R. with Wallmach, T., 509
- Dunn, P.J. Protocols for scientists on the deposition of investigated mineral specimens, 157
- Dunn, P.J. with Grice, J.D., 699
- Dunn, P.J. with Roberts, A.C., 451
- Eby, R. with Hawthorne, F.C., 205
- Erick, T.S. with Roberts, A.C., 129
- Evans, H.T. Jr. The crystal structure of hewettite, 181
- Ferguson, R.B. with Grice, J.D., 137
- Ferguson, R.B. with McGregor, C.R., 457
- Forri, F. with Ghent, E.D., 59
- Fleet, M.E. with Pan, Y., 565
- Foord, E.E. & Cook, R.B. Mineralogy and paragenesis of the McAllister Sn-Ta-bearing pegmatite, Coosa County, Alabama, 93
- Foord, E.E. & Shawe, D.R. The Pb-Bi-Ag-Cu-(Hg) chemistry of galena and some associated sulfosalts: a review and some new data from Colorado, California and Pennsylvania, 363
- Fralick, P.W., Barrett, T.J., Jarvis, K.E., Schnieders, B.R. & Vandekemp, R. Sulfide-facies iron formation at the Archean Morley occurrence, northwestern Ontario: contrasts with oceanic hydrothermal deposits, 601
- Francolet, A.-M. The problem of Na-Li substitution in primary Li-Al phosphates: new data on lacroixite, a relatively widespread mineral, 211
- Froese, E. with Bristol, C.C., 593
- Gessell, J.A., Zantop, H. & Birrell, R.W. Silver sulfosalts of the Santo Niño vein, Fresnillo District, Zacatecas, Mexico, 401
- Gerstner, M.R., Bowes, J.R. & Pastoriza, J.D. Skarn formation at the Macmillan Pass tungsten deposit (Macrang), Yukon and Northwest Territories. I. P-T-X-V characterization of the methane-bearing, skarn-forming fluids, 545
- Ghent, E.D., Stout, M.Z. & Ferri, F. Chloritoid-paragonite-pyrophyllite and stilpnomelane-bearing rocks near Blackwater Mountain, western Rocky Mountains, British Columbia, 59
- Greenwood, H.J. On models and modeling, 1
- Greenwood, H.J. with Cheng, W., 657
- Grice, I.E. with Harris, D.C., 427
- Grice, J.D. The crystal structure of magnolite,  $Hg_2TeO_4$ , 133
- Grice, J.D., Dunn, P.J. & Ramik, R.A. Whiteite-(CaMnMg), a new mineral species from the Tip Top pegmatite, Custer, South Dakota, 699
- Grice, J.D. & Ferguson, R.B. The crystal structure of arsenochalcocite, 137
- Grice, J.D. & Hawthorne, F.C. Refinement of the crystal structure of leucophanite, 193
- Grice, J.D. & Robinson, G.W. Peruvite, a new member of the tourmaline group, and its crystal structure, 199
- Grice, J.D. with Roberts, A.C., 129
- Groat, L.A. with Hawthorne, F.C., 205
- Groat, L.A. with Hawthorne, F.C., 193
- Harrison, D.C., Hoskins, B.F., Gray, I.E., Criddle, A.J. & Stanley, C.J. Hemloite  $(As,Se)(Ti,V,Fe,Al)_2O_3(OH)$ : a new mineral from the Hemlo gold deposit, Hemlo, Ontario and its crystal structure, 427
- Hassan, I. & Buseck, P.R. Cluster ordering and antiphase domain boundaries in hauyne, 173
- Hassan, I. & Grundy, H.D. The structure of nosean, ideally  $Na_2[AlSi_3O_8]SO_4 \cdot H_2O$ , 165
- Hatton, C.J. with Wallmach, T., 509
- Hawthorne, F.C., Groat, L.A. & Ebby, R.K. Antlerite,  $Ca_3SO_4(OH)_4$ , a heteropolyhedral伟晶岩 structure, 205
- Hawthorne, F.C. with Grice, J.D., 193
- Haynes, F.M. & Schriever, K. Fluid-inclusion evidence of copper remobilization during retrograde metamorphism in the central Labrador Trough, 23
- Hoskins, B.F. with Harris, D.C., 427
- Hovis, G.L. Effect of Al-Si distribution on the powder-diffraction maxima of alkali feldspars and an easy method to determine Ti and Zr site occupancies, 107
- Hughes, J.M. with Dai, Y., 189
- Iwanuch, W. with Coimbra, A.M., 119
- Jaycox, K.E. with Fralick, P.W., 601
- Jedwab, J. & Boulegue, J. A vanadium-titanium carbide inclusion in graphite from hydrothermal ejecta at 13°N, East Pacific Rise, 617
- Kelebertsia, A.E. Formation of sulfates at the Thiaphes area of Milos Island: possible precursors of kaolin mineralization, 241
- Kerrick, R. with King, R.W., 419
- King, R.W. & Kerrich, R. Chromian dravite associated with ultramafic-rock-hosted Archean lode gold deposits, Timmins-Porcupine District, Ontario, 419
- Kissin, S.A. A reinvestigation of the stannite ( $Cu_2FeS_3$ ) - kesterite ( $Cu_2ZnS_3$ ) pseudobinary system, 689
- Kissin, S.A. & Owens, D.R. The relatives of stannite in the light of new data, 673
- Kodama, H. with Percival, J.B., 633
- Laflamme, J.H.G. with Cabri, L.J., 353
- Lagache, M. with Manier-Clavina, V., 663
- Lynch, J.V.G. Large-scale hydrothermal zoning reflected in the tetrahedrite-freebridge solid solution, Keno Hill, Ag-Pb-Zn district, Yukon, 383
- Mandziuk, W.S., Brisbin, W.C. & Scoates, R.F.J. Igneous structures in the Selkirk Metasedimentary Complex, southeastern Manitoba, 81
- Manier-Clavina, V., Couty, R. & Leplat, M. The removal of alkalis from beryl: structural adjustments, 661
- Manning, P.G. Iron, phosphorus and lead relationships in suspended sediments from Lake St. Clair and the Detroit River, 247
- Marzoni Fecia di Cossato, V., Orlandi, P. & Fasero, M. Manganese-bearing bertrandite from Mangualde, Portugal: mineral data and structure refinement, 441
- Marzoni Fecia di Cossato, V., Orlandi, P. & Vazzalini, G. Rittmannite, a new mineral species of the whiteite group from the Mangualde granitic pegmatite, Portugal, 447
- Mariano, A.N. & Roeder, P.L. Wholerite: chemical composition, cathodoluminescence and environment of crystallization, 709
- McGregor, C.R. & Ferguson, R.B. Characterization of phases and twins in alkali feldspars by the X-ray precession technique, 457
- Merlino, S., Orlandi, P., Perchiazzi, N., Bassi, R. & Palenzona, A. Polytypyism in stibivianite, 625
- Morimoto, N. Nomenclature of pyroxenes, 143

- Nakano, T. & Takahara, H. Intracrystalline distribution of major elements in zoned garnet from skarn in the Chichibu mine, central Japan: illustration by color-coded maps, 499
- Nutt, J.W. Chloritization and associated alteration at the Jabiluka unconformity-type uranium deposit, Northern Territory, Australia, 43
- O'Hanley, D.S., Chernosky, J.V., Jr. & Wicks, F.J. The stability of lizardite and chrysotile, 483
- O'Hanley, D.S. with Schandl, E.S., 579
- Olesen, N.O. with Schmidt, N.-H., 15
- Orlandi, P. with Marzoni Fecia Di Cossato, V., 441, 447
- Orlandi, P. with Merlini, S., 625
- Owen, J.V. Metasomatically zoned amphibolite inclusions in granitic-tonalitic pegmatite, Grenville Province, Quebec, 315
- Owens, D.R. with Kissin, S.A., 673
- Paar, W.H., Chen, T.T., Roberts, A.C., Cridle, A.J. & Stanley, C.J. Donhardtite, nickel-mercury sulfide, a new mineral species from Leogang, Salzburg Province, Austria, 257
- Palezona, A. with Merlini, S., 625
- Pan, Y. & Fleet, M.E. Cr-rich calc-silicates from the Hemlo area, Ontario, 565
- Pasero, M. with Marzoni Fecia Di Cossato, V., 441
- Pasteris, J.D. with Gerstner, M.R., 545
- Percheron, R. with Merlini, S., 625
- Perryman, J.B. & Kodama, H. Sudito from Cigar Lake, Saskatchewan, 633
- Peterson, R.C. with Roelofsen-Ahl, J.N., 703
- Pinch, W.W. with Roberts, A.C., 129
- Piret, P. & Bellens, M. The Gladstone-Dale constant  $K(UO_4)$  for uranyl phosphates and arsenates, 533
- Ramik, R.A. with Grice, J.D., 699
- Rao, P.S., Weil, J.A. & Williams, J.A.S. EPR investigation of carbonaceous natural quartz single crystals, 219
- Ripley, E.M. with Andrews, M.S., 293
- Robert, J.-L., Beny, J.-M., Beny, C. & Wolfinger, M. Characterization of lepidolites by Raman and infrared spectroscopies. I. Relationships between OH-stretching wavenumbers and composition, 225
- Roberts, A.C., Bonardi, M., Grice, J.D., Ercit, T.S. & Pinch, W.W. A study of magnolite,  $Hg^{2+}Fe^{3+}O_4$ , from Colorado, 129
- Roberts, A.C., Sturman, B.D., Dunn, P.J. & Roberts, W.L. Pararobertsite,  $Ca_2Mn_3(PO_4)_2 \cdot 3H_2O$ , a new mineral species from the Tip Top pegmatite, Custer County, South Dakota, and its relationship to robertsite, 451
- Roberts, A.C. with Paar, W.H., 257
- Roberts, W.L. with Roberts, A.C., 451
- Robinson, G.W. with Grice, J.D., 199
- Roeder, P.L. with Mariano, A.N., 709
- Roelofsen-Ahl, J.N. & Peterson, R.C. Gittinsite: a modification of the thortveitite structure, 703
- Schandl, E.S., O'Hanley, D.S. & Wicks, F.J. Rodingites in serpentinized ultramafic rocks of the Abitibi greenstone belt, Ontario, 579
- Schmidt, N.-H. & Olesen, N.O. Computer-aided determination of crystal-lattice orientation from electron channeling patterns in the SEM, 15
- Schnieders, B.R. with Fralick, P.W., 601
- Schrijver, K. with Haynes, F.M., 23
- Scotes, R.F.J. with Mandziuk, W.S., 81
- Shawe, D.R. with Foord, E.E., 363
- Smits, G. (U, Th)-bearing silicates in reefs of the Witwatersrand, South Africa, 643
- Springer, G. Chlorine-bearing and other uncommon minerals in the Strathcona Deep Copper Zone, Sudbury district, Ontario, 311
- Spry, P.G. & Wonder, J.D. Manganese-rich garnet rocks associated with the Broken Hill lead-zinc-silver deposit, New South Wales, Australia, 275
- Stanley, C.J. with Harris, D.C., 427
- Stanley, C.J. with Paar, W.H., 257
- Stout, M.Z. with Ghent, E.D., 59
- Sturman, B.D. with Roberts, A.C., 451
- Sutcliffe, R.H. Mineral variation in Proterozoic diabase sills and dykes at Lake Nipigon, Ontario, 67
- Takahara, H. with Nakano, T., 499
- Van Velthuizen, J. & Chao, G.Y. Griceite, LiF, a new mineral species from Mont Saint-Hilaire, Quebec, 125
- Vance, E.R. & Doern, D.C. Study of anatase pseudomorphs after titanite, 495
- Vande Kemp, R. with Fralick, P.W., 601
- Vezzalini, G. with Marzoni Fecia Di Cossato, V., 447
- Wolfinger, M. with Robert, J.-L., 225
- Wadsworth, W.B. & Baird, A.K. Modal analysis of granitic rocks by X-ray diffraction, 323
- Wallmach, T., Hatton, C.J., Droop, G.T.R. Extreme facies of contact metamorphism developed in calc-silicate xenoliths in the eastern Bushveld Complex, 507
- Weil, J.-A. with Pinch, W.W., 219
- Wicks, F.J. with O'Hanley, D.S., 483
- Williams, J.A.S. with Rao, P.S., 219
- Wonder, J.D. with Spry, P.G., 275
- Zantop, H. with Gemmell, J.B., 401

## SUBJECT INDEX

- A reinvestigation of the stannite ( $Cu_2FeSnS_4$ ) - kesterite ( $Cu_2ZnSnS_4$ ) pseudobinary system, (Kissin), 689
- A restudy of magnolite,  $Hg^{2+}Fe^{3+}O_4$ , from Colorado, (Roberts et al.), 129
- A vanadium-titanium carbide inclusion in graphite from hydrothermal ejecta at 13°N, East Pacific Rise, (Jedwab & Boulegue), 617
- Antlerite,  $Ca_2Si_2O_5(OH)_4$ , a heteropolyhedral wallpaper structure, (Hawthorne et al.), 205
- Caractérisation du bitume du massif calcaire de Visé (Belgique) et comparaison avec des anthrazolites nord-américaines, (Antenucci & Bourguignon), 525
- Characterization of lepidolites by Raman and infrared spectroscopies. I. Relationships between OH-stretching wavenumbers and composition, (Robert et al.), 225
- Characterization of phases and twins in alkali feldspars by the X-ray precession technique, (McGregor Ferguson), 457
- CHEMICAL ANALYSES (see also Electron-microprobe analyses)
- Minerals amblygonite, 214, anatase replacing titanite, 496, anthrazolite, 527, beraunite, 442, galena solid-solution, 375, griceite, 127, isostannite, 675, lacroixite, 213, lanthanite-(Nd), 120, lithiophorite, 102, montebrasite, 214, muscovite, 98
- Rocks amphibolite, 317, chert, 603, chlorite schist, 45, diabase, 69, garnetite, 283, granite, 95, granitic pegmatite, 317, hornfels, 296, iron formation, 603, lamprophyre, 585, metapelite, 45, pegmatite, 317, rodungite, 585, sandstone, 45, serpentinite, 585, tonalitic pegmatite, 317
- Chlorite-bearing and other uncommon minerals in the Strathcona Deep Copper Zone, Sudbury District, Ontario, (Springer), 311
- Chloritization and associated alteration at the Jabiluka unconformity-type uranium deposit, Northern Territory, Australia, (Nutt), 43
- Chloritoid-paragonite-pyrophyllite and stilpnomelane-bearing rocks near Blackwater Mountain, western Rocky Mountains, British Columbia, (Ghent et al.), 59
- Chromian dravite associated with ultramafic-rock-hosted Archean lode gold deposits, Timmins-Porcupine District, Ontario, (King & Kerrich), 419
- Cluster ordering and antiphase domain boundaries in hauyne, (Hassan & Buseck), 173
- Computer-aided determination of crystal-lattice orientation from electron channeling patterns in the SEM, (Schmidt & Olesen), 15
- COUPLED-ATOM SUBSTITUTIONS
- Phosphates lacroixite, 212
- Silicates feldspar, 111, garnet, 504, leucophanite, 194, pyroxenes, 144, titanite, 497, wohlerite, 713

- Sulfides arsenopyrite, 360, galena, 368, petruckite, 686, polybasite, 413, pyrrhotite, 413, stephanite, 413, tetrabedrite, 394, 413
- Cr-rich calc-silicates from the Hemlo area, Ontario, (Pan & Fleet), 565
- CRYSTALLOGRAPHY (see also Twinning)
- alkali feldspar, 457, apatite group, 189, beraunite, 442, beryl, 663, griceite, 127, incommensurate structures, 165, 173, lattice-orientation determination, 19, lone-pair electrons, 438, modulated structures, 165, 173, OB theory, 627, petruckite, 685, pyroxenes, 144, robertsite-parobernite, 454, sodalite group, 165, 173, stannite group, 681, 689, sudoite, 638, tourmaline group, 199, triclinicity, 477, wodginite, 100, wöhlerite, 712
- CRYSTAL STRUCTURE (see also X-ray diffraction)
- antierlite, 205, arsenochalcocite, 137, beraunite, 443, beryl, 663, ferulite, 199, gittinsite, 703, hemelite, 432, hewtite, 181, leucophanite, 193,  $Li_2V_6O_{10}$ , 183, magnolite, 133, marcasite, 165, pyromorphite, 183, stibivante, 625, vanadinite, 189
- Crystal structure refinements of vanadinite and pyromorphite, (Dai & Hughes), 189
- DIFFERENTIAL THERMAL ANALYSIS
- anatase replacing titanite, 496
- Donhardtite, nickel-mercury sulfide, a new mineral species from Leogang, Salzburg Province, Austria, (Paar et al.), 257
- Effect of Al-Si distribution on the powder-diffraction maxima of alkali feldspars and an easy method to determine T1 and T2 site occupancies, (Hovis), 107
- ELECTRON-MICROPROBE ANALYSES
- aikinite, 376, almandine, 598, amesite, 49, amphibole, 571, antimonepearceite, 408, arsenopyrite, 356, augite, 70, beryl, 102, 644, biotite, 62, 300, 317, 398, calcite, 62, canfieldite-(Te), 376, carbon peak-shifts, 619, cassiterite, 101, chalcopyrite, 267, chamosite, 49, chlorite, 49, 62, 582, 598, 638, chloritoid, 62, chromian dravite, 201, clinopyroxene, 582, clinochlore, 49, 572, clinopyroxene, 504, 513, 568, coiffinite, 648, columbite, 101, cordierite, 300, 598, diopside, 582, dolomite, 62, domharrite, 258, epidote, 570, esklomite, 375, ferrokorrensite, 381, ferruvite, 200, friedrichite, 369, gaudite, 598, galena, 267, 373, garnet, 284, 504, 568, gedrite, 598, graphite, 618, griceite, 127, grunerite, 312, gustavite, 369, hamelite, 429, hercynite, 598, hessite, 376, hayrovskite, 369, hornblende, 598, hydrogrossular, 582, ilmenite, 317, iron chloride, 312, kesterite, 675, 695, khamraebavit, 618, lacroixite, 212, magnetite, 317, magnolite, 131, matildite, 373, melilitite, 513, merwinite, 513, moncheite, 312, montebrasite, 214, monticellite, 513, muscovite, 98, niggliite, 312, olivine, 73, 513, pararobertsite, 453, pentlandite, 312, periclase, 513, petruckite, 682, phlogopite, 312, 513, 582, phlogopite-(Ba), 513, pigeonite, 70,

plagioclase, 73, 317, polybasite, 408, polybasite-(Se), 408, prehnite, 571, proustite, 408, pumpellyite, 571, pyrargyrite, 408, pyrite, 267, pyromorphite, 190, pyrophyllite, 62, pyrosmalite, 312, pyroxene, 70, pyrrhotite, 267, 312, rittmannite, 449, robertsite, 454, sepiolite, 312, sphalerite, 267, spinel, 513, stannite, 267, 675, 695, staurolite, 598, stephanite, 409, stibianite, 626, stilpnomelane, 62, sudoite, 638, tapiolite, 101, tetrahedrite, 394, 409, thorite, 648, tourmaline, 62, 200, 421, uraninite, 652, uranmicrolite, 101, uvarovite, 568, V-Ti carbide, 617, vanadinite, 190, vesuvianite, 582, whiteite-(CaMnMg), 701, wodginite, 100, wöhlerite, 712, zircon, 651

EPR investigation of carbonaceous natural quartz single crystals, (Rao et al.), 219

#### EXPERIMENTAL (see also Petrology)

##### Activity/Fugacity

calcium, 32, carbonate, 64, copper, 36 magnesium, 32, methane, 56, oxygen, 34, 301, 621, silica, 75, sulfur, 34, 301

##### General

ACF diagram, 584, AKF diagram, 587, Al-Si distribution in alkali feldspars, 111, alkali feldspar twinning, 457, anatase replacing titanite, 495, carbon isotopes, 287, 527, carbon peak-shifts, 619, cathodoluminescence, 711, chalcopirite disease, 271, chemographic analysis, 485, Cu/Ni ratio in pyrite, 267, color-coded compositional mapping, 501, decrepitate analyses, 25, electron channeling patterns, 15, electron paramagnetic resonance spectra, 219, fluid inclusion analysis, 549, Gladstone-Dale constants, 533, ion-probe microanalysis, 355, iscocon diagram, 319, lattice-orientation determination, 19, modal analysis, 323, modeling, 1, NMR spectra, 527, OH groups in micas, 227, 520, oxygen isotopes, 298, precession photographs of feldspar twins, 461, pyroxene classification, 146, quantitative X-ray diffraction, 323, Raman spectra, 225, 553, selenium in sulfides, 266, 408, 603, serpentization, 491, stannite-kesterite system, 689, sulfur isotopes, 611, zoisite + diopside stability, 657

Extreme facies of contact metamorphism developed in calc-silicate xenoliths in the eastern Bushveld complex, (Walmach et al.), 509

Feruvite, a new member of the tourmaline group, and its crystal structure, (Grice & Robinson), 199

Fluid-inclusion evidence of copper remobilization during retrograde metamorphism in the central Labrador Trough, (Haynes & Sculiviver), 23

Formation of sulfates at the Thiaxes area of Milos Island: possible precursors of kaolin mineralization, (Kelepertse), 241

Gittinsite: a modification of the thortveitite structure, (Poelefonen-Ahl & Peterson), 703

Griceite, LiF, a new mineral species from Mont Saint-Hilaire, Quebec, (Van Velthuizen & Chao), 125

Hemloite (As,Sb)<sub>2</sub>(Ti,V,Fe,Al)<sub>2</sub>O<sub>9</sub>OH: a new mineral from the Hemlo gold deposit, Hemlo, Ontario and its crystal structure, (Harris et al.), 427

Highly metamorphosed altered rocks associated with the Osborne Lake volcanicogenic massive sulfide deposit, Snow Lake area, Manitoba, (Bristol & Froese), 593

Igneous structures in the Falcon Lake Intrusive Complex, southeastern Manitoba, (Mandziuk et al.), 81

##### INFRARED-ABSORPTION SPECTRA

anthraxolite, 527, beryl, 665, bitumen, 527, lepidolite, 225, OH-stretching band nomenclature, 231

Intracrystalline distribution of major elements in zoned garnet from skarn in the Chichibu mine, central Japan: illustration by color-coded maps, (Nakano & Takahara), 499

Iron, phosphorus and lead relationships in suspended sediments from Lake St. Clair and the Detroit River, (Manning), 247

Lanthanite-(Nd) from Santa Isabel, state of São Paulo: second Brazilian occurrence, (Coimbra et al.), 119

Large-scale hydrothermal zoning reflected in the tetrarhombo-hedrite-freibergite solid solution, Keno Hill, Ag-Pb-Zn district, Yukon, (Lynch), 383

Manganese-bearing berunite from Mangualde, Portugal: mineral data and structure refinement, (Marzoni Fecia di Cossato et al.), 441

Manganese-rich garnet rocks associated with the Broken Hill lead-zinc-silver deposit, New South Wales, Australia, (Spry & Wonder), 275

Mass transfer and sulfur fixation in the contact aureole of the Duluth Complex, Dunka Road Cu-Ni deposit, Minnesota, (Andrews & Ripley), 293

Metasomatically zoned amphibolite inclusions in granitic-tonalitic pegmatite, Grenville Province, Quebec, (Owen), 315

##### MICROBEARNESS

donharrsite, 258, ferrokesterite, 680, hemloite, 429, petruite, 680.

##### MINERAL DATA (see also Electron-microprobe analyses)

akimoto-friedrichite series, 372, alunogen, 244, amblygonite, 214, amosite, 49, anatase, 495, 653, anatracholite, 525, antierite, 205, arsenoanhacornerite, 137, arsenopyrite, 356, berunite-(Mn), 441, beryl, 102, 663, biotite, 300, bitumen, 523, canfieldite-(Te), 375, cassiterite, 101, chalcopyrite, 261, chalcocite, 51, chalophile, 646, chlorite, 49, 633, chloritoid, 61, chromian dravite, 424, chrome-(Zn), 568, chrysotile, 483, clinochlore, 51, 571, clinopyroxene, 504, 513, 567, coffinite, 648, cordierite, 300, dawsonite, 537, epidote, 570, eskoite, 372, ferrokesterite, 673, feruvite, 199, freibergite, 393, galena solid-solution, 366, galena, 267, 363, garnet, 282, 504, 568, garnet-(Cr), 568, gittinsite, 703, graphite, 618, griceite, 125, grunerite, 312, hauyne, 173, hemloite, 427, hewettite, 181, heymovskite, 373, hydrogrossular, 582, iron chloride, 312, isostannite (discredited), 673, kaolinite, 244, kesterite, 673, 689, khambrabawite, 618, kinoshitalite, 520, lacroixite, 211, lanthanite-(Nd), 119, lepidolite, 225, leucophanite, 193, lillianite-gustavite series, 373, lithophorite, 102, lizardite, 483, magnolite, 129, 133, manganoferous berunite, 441, matildite, 369, millose, 513, merwinite, 513, monchite, 312, montebrasite, 214, monticellite, 513, mountain leather, 237, muscovite, 99, niggite, 312, nosean, 165, ourayite, 376, palygorskite, 238, paragonite, 61, pararobertsuite, 451, pentlandite, 312, periclase, 513, petruite, 673, phlogopite, 312, polybasite-arsenopyrite, 409, polybasite-(Se), 408, pyrargyrite-proustite, 408, pyrite, 267, pyromorphite, 189,

pyrophyllite, 61, pyrosomalite, 312, pyrrhotite, 267, quartz, 219, rittmannite, 447, robertsite, 454, selenian polybasite, 408, sepiolite, 238, 312, sphalerite, 267, stannite, 267, 673, 689, stephanite, 410, stilbivanite, 625, sudoite, 633, tellurian canfieldite, 375, tetrahedrite, 393, 411, thorite, 648, titanite, 495, tourmaline-(Cr), 421, uraninite, 652, uvarovite, 568, V-Ti carbide, 617, vanadinite, 189, whiteite-(CaMnMg), 699, wodginite, 100, wöhlerite, 709, zircon, 651

##### MINERALOGICAL ASSOCIATION OF CANADA

Berry medal, 731, book reviews, 159, 343, 535, 721, deposition of investigated mineral specimens, 157, guidelines for the preparation of a manuscript, 347, Hawley medal, 725, Past Presidents' medal, 729, proceedings of the 34th annual meeting, 723, referee for 1988, 163

Mineral variation in Proterozoic diabase sills and dykes at Lake Nipigon, Ontario, (Sutcliffe), 67

Mineralogy and paragenesis of the McAllister Sn-Ta-bearing pegmatite, Coosa County, Alabama, (Foord & Cook), 93

Modal analysis of granitic rocks by X-ray diffraction, (Wadsworth & Bain), 923

##### MOSSBAUER SPECTROSCOPY

river suspended-sediments, 249, wodginite, 95

##### NEW MINERAL SPECIES

donharrsite, 257, ferrokesterite, 673, feruvite, 199, griceite, 125, hemloite, 427, pararobertsuite, 451, petruite, 673, rittmannite, 447, stibivanite-2Q, 625, whiteite-(CaMnMg), 699

##### NOMENCLATURE

chlorite, 633, donharrsite, 257, ferrokesterite, 673, feruvite, 199, garnet-rich rock types, 278, griceite, 125, hemloite, 427, hydrated (U, Th)-silicates, 655, isostannite discredited, 673, model, 1, mountain leather, 237, OH-stretching bands, 231, pararobertsuite, 451, petruite, 673, pyroxenes, 143, rittmannite, 447, stibivanite, 625, tourmaline group, 199, 419, whiteite-(CaMnMg), 699, whiteite group, 449, 699

##### Nomenclature of pyroxenes, (Morimoto), 143

On models and modeling, (Greenwood), 1

##### OPTICAL PROPERTIES

###### General

anthracholite, 528, beraunite, 442, chromian dravite, 421, feruvite, 200, griceite, 126, lanthanite-(Nd), 119, magnolite, 130, rittmannite, 448, stibivanite-2Q, 627, whiteite-(CaMnMg), 700

##### Reflectance

anthracholite, 526, donharrsite, 260, ferrokesterite, 680, hemloite, 429, ourayite, 377, petruite, 680, tellurian canfieldite, 375

Pararobertsuite, Ca<sub>2</sub>Mn<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>·3H<sub>2</sub>O, a new mineral species from the Tip Top pegmatite, Custer County, South Dakota, and its relationship to robertsite, (Roberts et al.), 451

##### PETROLOGY (see also Experimental)

alkali feldspar twinning, 457, amphibolite geochemistry, 317, anatase replacing titanite, 495, bathogratic point, 602, Bushveld complex, 509, calcsilicate rocks, 500, 565, carbonatite, 173, carbonatite, 705, chlorite-silicate tectonite, 36, chlorite minerals, 312, chloritization, 43, 593, 633, contact metamorphism, 309, copper remobilization, 34, diabase, 67, 75, diabase cooling, 75, differentiation, 77, 85, dôlith complex, 293, fluid-inclusion salinity, 552, fluid inclusions, 23, 516, 545, 558, galena chemistry, 363, geobarometry, 28, 63, 271, 298, 516, 556, 662, geothermometry, 28, 63, 270, 298, 415, 516, 556, greisen, 97, hydrothermal zoning, 383, 593, "invisible" gold, 383, iron formation, 601, kaolinitization, 242, lamprophyre, 581, layered structures, 84, massive sulfides, 263, 275, 593, metasonatism, 315, modeling, 1, mountain leather, 237, peak metamorphic condition indicators, 31, 59, 509, 574, pegmatite, 93, 211, 315, 441, 447, 451, 699, petrofabric study, 21, polypyramidal, 625, REE patterns, 121, 610, retrograde metamorphism, 31, rodingerite, 579, 657, sea-floor massive sulfides, 612, 617, serpentization, 491, skarn, 293, 499, 545, sulfate alteration, 244, tetrahedrite-freibergite, 394, uranium precipitation, 55, zoned garnet, 499, 569

Polypyramidal in stibivanite, (Merlino et al.), 625

Protocols for scientists on the deposition of investigated mineral specimens, (Dunn), 157

Refinement of the crystal structure of leucophanite, (Grice & Hawthorne), 193

Rittmannite, a new mineral species of the whiteite group from the Mangualde granite pegmatite, Portugal, (Marzoni Fecia di Cossato et al.), 447

Rodingerite in serpentized ultramafic rocks of the Abitibi greenstone belt, Ontario, (Schandl et al.), 579

##### SCANNING-ELECTRON MICROGRAPHY

anatase, 653, armenopyrite, 357, donharrsite, 259, feruvite, 200, galena, 372, graphite, 618, lacroixite, 214, montebrasite, 214, pararobertsuite, 452, rittmannite, 448, stannite-kesterite, 678, sudoite, 639, sulfide iron formation, 607, synthetic beryl, 665, V-Ti carbide, 618, wöhlerite, 717

Silver sulfosalts of the Santo Niño vein, Fresnillo District, Zacatecas, Mexico, (Gemmell et al.), 401

Skarn formation at the Macmillan Pass tungsten deposit (MacTung), Yukon and Northwest Territories. I. P-T-X-V characterization of the methane-bearing, skarn-forming fluids, (Gerstner et al.), 545

Study of anatase pseudomorphs after titanite, (Vance & Doern), 495

Sudoite from Cigar Lake, Saskatchewan, (Percival & Kodama), 633

Sulfide-facies iron formation at the Archean Morley occurrence, northwestern Ontario: contrasts with oceanic hydrothermal deposits, (Pralick et al.), 601

##### TEXTURES

anatase pseudomorphs, 495, 653, coffinite, 655, diabase, 73, ferrokesterite, 676, gabbro, 84, galena with exsolved sulfosalts, 374, galena-pyrargyrite symplectite intergrowth, 407, garnetite, 280, hornfels, 296, 548, illite-chlorite, 639, lacroixite, 214, merwinite, 514, montebrasite, 214, monticellite-diopside-forsterite symplectite, 514, mountain leather, 237, petruite, 679, pyroxene, 73, rodingerite, 583, skarn, 500, 548, stannite, 676, stannite-kesterite, 678, 695, sudoite, 639, symplectite, 407, 514, sulfide iron formation,

- 604, U-Th silicates, 645, wöhlerite, 717, xenolith, 514, zoned garnet, 501  
 The crystal structure of arsenohauchecornite, (Grice & Ferguson), 137  
 The crystal structure of hewettite, (Evans), 181  
 The crystal structure of magnolite,  $Hg_2TeO_3$ , (Grice), 133  
 The Gladstone-Dale constant  $K(UO_2)$  for uranyl phosphates and arsenates, (Piret & Deliens), 533  
 The nature of "invisible" gold in arsenopyrite, (Cabri et al.), 353  
 The Pb-Bi-Ag-Cu-(Hg) chemistry of galena and some associated sulfosalts: a review and some new data from Colorado, California and Pennsylvania, (Foord & Shawe), 363  
 The problem of Na-Li substitution in primary Li-Al phosphates: new data on lacroixite, a relatively widespread mineral, (Francoiset), 211  
 The relatives of stannite in the light of new data, (Kissen & Stevens), 673  
 The removal of alkalis from beryl: structural adjustments, (Manier-Clavinau et al.), 663  
 The stability of lizardite and chrysotile, (O'Hanley et al.), 483  
 The stability of the assemblage zoisite + diopside, (Cheng & Greenwood), 657  
 The structure of nosean, ideally  $Na_8[Al_6Si_2O_{12}]SO_4 \cdot H_2O$ , (Hassan & Grundy), 165  
**THERMOGRAVIMETRIC ANALYSIS**  
 anatase replacing titanite, 497, whiteite-(CaMnMg), 701  
 Trace-element contents and partitioning of elements in ore minerals from the CSA Cu-Pb-Zn deposit, Australia, and implications for ore genesis, (Brill), 263  
**TRACE-ELEMENT DATA**  
 chalcopyrite, 267, chert, 603, galena, 267, 375, granite, 96, iron formation, 603, lanthanite-(Nd), 120, muscovite, 98, pyrite, 267, 603, pyrrhotite, 267, sphalerite, 267, stannite, 267  
**TRANSMISSION ELECTRON MICROGRAPHY**  
 arsenopyrite, 359, hauyne, 175  
**TWINNING** (see also Crystallography)  
 albite, 465, alkali feldspar, 457, grossular, 569, hewettite, 187, lanthanite-(Nd), 120, montebrasite, 214, pericline, 465, petrukitite, 682, wöhlerite, 714  
 (U, Th)-bearing silicates in reefs of the Witwatersrand, South Africa, (Smith), 643  
 Whiteite-(CaMnMg), a new mineral species from the Tip Top pegmatite, Chuster, South Dakota, (Grice et al.), 699  
 Wöhlerite: chemical composition, cathodoluminescence and environment of crystallization, (Marianno & Roeder), 709  
**X-RAY DIFFRACTION** (see also Crystal Structure)  
**Cell Dimensions**  
 antlerite, 206, arsenohauchecornite, 137, berunite, 443, beryl, 666, donharrsite, 260, ferrokesterite, 682, feruvite, 201, griceite, 126, hemloite, 432, hewettite, 182, hydrogrossular, 584, lacroixite, 213, lanthanite-(Nd), 122, magnolite, 131, 133, nosean, 166, pararobertsite, 453, petrukitite, 683, pyromorphite, 190, rittmannite, 449, stibivaneite-20, 626, vanadinite, 190, vesuvianite, 584, whiteite-(CaMnMg), 701, weddellite, 100  
**Powder Data**  
 anthraxolite, 528, arsenohauchecornite, 142, berunite, 443, clinochlore, 51, donharrsite, 261, feldspar, 108, ferrokesterite, 682, feruvite, 201, griceite, 126, hemloite, 431, iron chloride, 312, lacroixite, 213, lanthanite-(Nd), 122, magnolite, 131, pararobertsite, 453, petrukitite, 683, rittmannite, 449, stibivaneite-20, 631, sudoite, 636, whiteite-(CaMnMg), 701, weddellite, 100  
 X-ray investigation of "mountain leather", (Cavallo), 237