

THE CANADIAN MINERALOGIST

VOLUME 32, INDEX

J. DOUGLAS SCOTT

203-44 Brousseau Avenue, Timmins, Ontario P4N 5Y2

AUTHOR INDEX

- Abbott, R.N., Jr., Electronic polarizability of oxygen and various cations in selected triclinic minerals: point-dipole theory, 909
 Abbott, R.N., Jr., Energy calculations bearing on the dehydroxylation of muscovite, 87
 Auriacchio, C., Grubessi, O. & Zecchini, P., Infrared spectroscopy and crystal chemistry of the beryl group, 55
 Bancroft, G.M. with Li, Dien, 81
 Barnett, R.L. with Pan, Yuanming, 133
 Bayliss, P. with Wang, Liben, 865
 Bea, F. with Pereira, M.D., 763
 Belendoff, K. with Effenberger, H., 365
 Bernhardt, H.-J. with Effenberger, H., 365
 Blaton, N. with Vochten, R., 553
 Bordiau, Y.S. with Mozgova, N.N., 359
 Boschmann, K.F., Burns, P.C., Hawthorne, F.C., Raudsepp, M. & Turnock, A.C., A-site disorder in synthetic fluor-edenite: a crystal-structure study, 21
 Bouchéz, J.-L. with Launeau, P., 919
 Bowles, J.F.W., Gize, A.P. & Cowden, A., The mobility of the platinum-group elements in the soils of the Freetown Peninsula, Sierra Leone, 957
 Brown, D. & Mason, R.A., An occurrence of sectoried birefringence in almandine garnet, 105
 Brownfield, M.E. with Foord, E.E., 839
 Burns, P.C., Cooper, M.A. & Hawthorne, F.C., Jahn-Teller distorted Mn³⁺O₆ octahedra in fredrikssonite, the fourth polymorph of Mg₂Mn³⁺(BO₃)O₂, 397
 Burns, P.C. & Hawthorne, F.C., Hydrogen bonding in tunellite, 895
 Burns, P.C. & Hawthorne, F.C., Kaliborite: an example of a crystallographically symmetrical hydrogen bond, 885
 Burns, P.C. & Hawthorne, F.C., Structure and hydrogen bonding in inderborite, a heteropolyhedral sheet structure, 533
 Burns, P.C. & Hawthorne, F.C., Structure and hydrogen bonding in preobrazhenkite, a complex heteropolyhedral borate, 387
 Burns, P.C. & Hawthorne, F.C., The crystal structure of humberstonite, a mixed sulfate-nitrate mineral, 381
 Burns, P.C., MacDonald, D.J. & Hawthorne, F.C., The crystal chemistry of manganese-bearing elbaite, 31
 Burns, P.C. with Boschmann, K.F., 21
 Burns, P.C. with Grice, J.D., 1
 Burt, D.M. with Grauch, R.I., 439
 Burt, D.M., Vector representation of some mineral compositions in the aenigmatite group, with special reference to høgtvaitte, 449
 Cabri, L.J. with Wagner, F.E., 189
 Callegari, A. with Caucia, F., 477
 Callegari, A. with Hawthorne, F.C., 491, 714
 Caucia, F., Callegari, A., Oberti, R., Ungaretti, L. & Hawthorne, F.C., Structural aspects of oxidation - dehydrogenation of staurolite, 477
 Caucia, F. with Hawthorne, F.C., 491, 714
 Černík, R.J. with Cresssey, B.A., 257
 Černý, P. with Ercit, T.S., 415
 Černý, P. with Teertstra, D.K., 69
 Chang, I.-Y. with Liu, Huifang, 185
 Chao, G.Y. with McDonald, A.M., 843
 Chapman, C.A.T. with Clarke, D.B., 815
 Charoy, B., Lhote, F., Dusausoy, Y. & Noronha, F., The crystal chemistry of spodumene in some granitic aplite-pegmatite bodies of northern Portugal: a comparative review: reply, 226
 Chi, P.H. with Rouse, R.C., 43
 Chovan, M. with Uher, P., 319
 Clarke, D.B., Mitchell, R.H., Chapman, C.A.T. & MacKay, R.M., Occurrence and origin of djerfisherite from the Elwin Bay kimberlite, Somerset Island, Northwest Territories, 815
 Clarke, D.B. & Rotura, A., Garnet-forming and garnet-eliminating reactions in a quartz diorite intrusion at Capo Vaticano, Calabria, Italy, 623
 Cleland, J.M. with McSwiggen, P.L., 589
 Cook, N.J. & Wood, S.A., Platinum-group minerals in the Lac Sheen Cu-Ni-PGE prospect, Quebec, 703
 Cooper, M.A. & Hawthorne, F.C., Refinement of the crystal structure of kulanite, 15
 Cooper, M.A. & Hawthorne, F.C., The crystal structure of wherryite, Pb₂Cu₃(SO₄)₂(SiO₄)₂(OH)₂, a mixed sulfate-silicate with [¹⁶M(TO₄)₂] chains, 373
 Cooper, M.A., Hawthorne, F.C., Novák, M. & Taylor, M.C., The crystal structure of fusitonite, Mn²⁺Sn⁴⁺(BO₃)₂, a dolomite-structure borate, 903
 Cooper, M.A. with Burns, P.C., 397
 Cooper, M.A. with Lam, A.E., 525
 Cowden, A. with Bowles, J.F.W., 957
 Cresse, B.A., Cresssey, G. & Černík, R.J., Structural variations in chrysotile asbestos fibers revealed by synchrotron X-ray diffraction and high-resolution transmission electron microscopy, 257
 Cresssey, G. with Cresssey, B.A., 257
 Crocket, J.H. with Good, D.J., 681
 Cruden, A.R. with Launeau, P., 919
 Davis, A.M. with Foord, E.E., 839
 Dobré, R.T.M., Lustenhouwer, W.J., Zakrzewski, M.A., Goubitz, K., Fraanje, J. & Schenck, H., Kieftite, CoSb₃, a new member of the skutterudite group from Tunaberg, Sweden, 179
 Drexl, J.W. with Hughes, J.M., 563
 Drexl, J.W. with Wang, Liben, 865
 Dunn, P.J. with Rouse, R.C., 43
 Dusausoy, Y. with Charoy, B., 226
 Effenberger, H., Krause, W., Belendoff, K., Bernhardt, H.-J., Medenbach, O., Hybler, J. & Pettfek, V., Revision of the crystal structure of mřázkite, Bi₂Cu₃(OH)₂(PO₄)₂·2H₂O, 365
 Ercit, T.S., The geochemistry and crystal chemistry of columbite-group minerals from granitic pegmatites, southwestern Grenville Province, Canadian Shield, 421
 Ercit, T.S. & Robinson, G.W., A refinement of the structure of ferringtonite from Kalzas Mountain, Yukon, and observations on the tungsten pyrochlorites, 567
 Ercit, T.S. & Van Velthuizen, J., Gaultite, a new zeolite-like mineral from Mont Saint-Hilaire, Quebec, and its crystal structure, 855
 Ercit, T.S. with Groat, L.A., 497, 505
 Ercit, T.S., Hawthorne, F.C. & Černý, P., The structural chemistry of kalipyrochlorite, a "hydropyrochlorite", 415
 Evans, H.T., Jr., Post, J.E., Ross, D.R. & Nelen, J.A., The crystal structure and crystal chemistry of fernandinitite and corvusite, 339
 Evans, H.T., Jr. with Grauch, R.I., 439
 Fitzpatrick, J.J. with Grauch, R.I., 439
 Fleet, M.E. with Pan, Yuanming, 133, 825
 Foord, E.E., Brownfield, M.E., Lichte, F.E., Davis, A.M. & Sutley, S.J., Mccrillite, NaCs(BeLi)Zr₂(PO₄)₄·1-2H₂O, a new mineral species from Mount Mica, Oxford County, Maine, and new data for gainesite, 839
 Foord, E.E. with Grauch, R.I., 439
 Fraanje, J. with Dobré, R.T.M., 179
 Friedl, J. with Wagner, F.E., 189
 Friedrich, G. with Konty, A., 803
 Gartrell, B. with Grice, J.D., 333
 Garwood, B.L. with Meyer, H.O.A., 295
 Gault, R.A. with Grice, J.D., 333, 405
 Giesler, G., Lengauer, C.L. & Redhammer, G., Characterization of the Fe₃O₄·H₂O - Cu₂Fe₃O₄·H₂O solid-solution series, and the nature of poitevinite, (Cu,Fe)SO₄·H₂O, 873
 Gize, A.P. with Bowles, J.F.W., 957
 Gomes, C.L. with Nunes, J.E.L., 223
 Good, D.J. & Crocket, J.H., Origin of albite pods in the Geordie Lake gabbro, Port Coldwell alkaline complex, northwestern Ontario: evidence for late-stage hydrothermal Cu-Pd mineralization, 681
 Gordon, T.M. with Nicholls, J., 969
 Goubitz, K. with Dobré, R.T.M., 179
 Graff, P.-R. with Grauch, R.I., 439
 Grauch, R.I., Lindahl, I., Evans, H.T., Jr., Burt, D.M., Fitzpatrick, J.J., Foord, E.E., Graff, P.-R. & Hysingjord, J., Høgtvaitte, a new berclarian member of the aenigmatite group from Norway, with new X-ray data on aenigmatite, 439
 Grice, J.D., Burns, P.C. & Hawthorne, F.C., Determination of the megastructures of the borate polymorphs pringleite and ruitenbergite, 1
 Grice, J.D., Gartrell, B., Gault, R.A. & Van Velthuizen, J., Ernienickelite, NiMn₃O₄·3H₂O, a new mineral species from the Siberia complex, Western Australia: comments on the crystallography of the chalcoaphanite group, 333
 Grice, J.D., Van Velthuizen, J. & Gault, R.A., Petersenite-(Ce), a new mineral from Mont Saint-Hilaire, and its structural relationship to other REE carbonates, 405

- Grice, J.D. with McDonald, A.M., 843
 Groat, L.A., Hawthorne, F.C. & Ercit, T.S., Excess Y-group cations in the crystal structure of vesuvianite, 497
 Groat, L.A., Hawthorne, F.C. & Ercit, T.S., The incorporation of boron into the vesuvianite structure, 505
 Groat, L.A. with Lam, A.E., 525
 Groat, L.A. with Russell, J.K., 575
 Grubessi, O. with Aurisicchio, C., 55
 Halleran, A.A.D. with Russell, J.K., 575
 Harris, D.C. with Wagner, F.E., 189
 Hawthorne, F.C., Oberti, R., Ungaretti, L., Caucia, F. & Callegari, A., Crystal-structure refinement of hydrogen-rich staurolite, 491
 Hawthorne, F.C., Ungaretti, L., Oberti, R., Caucia, F. & Callegari, A., The crystal chemistry of staurolite: reply, 714
 Hawthorne, F.C. with Boschmann, K.F., 21
 Hawthorne, F.C. with Burns, P.C., 31, 381, 387, 397, 533, 885, 895
 Hawthorne, F.C. with Caucia, F., 477
 Hawthorne, F.C. with Cooper, M.A., 15, 373, 903
 Hawthorne, F.C. with Ercit, T.S., 415
 Hawthorne, F.C. with Grice, J.D., 1
 Hawthorne, F.C. with Groat, L.A., 497, 505
 Hawthorne, F.C. with Lam, A.E., 525
 Hawthorne, F.C. with Liang, Jian-Jie, 541
 Hemingway, B.S. with Robie, R.A., 945
 Henry, D.J., Lu, Gang & McCabe, C., Epigenetic tourmaline in sedimentary red-beds: an example from the Silurian Rose Hill Formation, Virginia, 599
 Herzig, P. with Kontny, A., 803
 Hibbard, M.J. & Sjoberg, J.J., Signs of incongruent melting of clinopyroxene in limburgite, Thetford Hill, Vermont, 307
 Hollister, L.S., The crystal chemistry of staurolite: discussion, 713
 Hughes, J.M. & Drexler, J.W., Refinement of the structure of gagarinit-(Y), Na₂(Ca,REE₂)₂F₆, 563
 Hughes, J.M. with Wang, Liben, 865
 Hybler, J. with Effenberger, H., 365
 Hysingjord, J. with Grauch, R.L., 439
 Ixer, R.A. with Pritchard, H.M., 271
 Johnson, C.A., Partitioning of zinc among common ferromagnesian minerals and implications for hydrothermal mobilization, 121
 Kamata, K. with Uehara, S., 93
 Kassoli-Fournarakis, A. & Michailidis, K., Chemical composition of tourmaline in quartz veins from Nea Roda and Thasos areas in Macedonia, northern Greece, 607
 Keyssner, S. with Kontny, A., 803
 Knowles, C.R. with Liu, Huifang, 185
 Kontny, A., Friedrich, G., Herzig, P. & Keyssner, S., Argentian-pentlandite-bearing assemblages in metamorphic rocks of the KTB pilot hole, Oberpfalz, Germany, 803
 Krause, W. with Effenberger, H., 365
 Lam, A.E., Groat, L.A., Cooper, M.A. & Hawthorne, F.C., The crystal structure of wickenburgite, Pb₂CaAl[AlSi₁₀O₂₄](H₂O)₃, a sheet structure, 525
 Launeau, P., Cruden, A.R. & Bouchez, J.-L., Mineral recognition in digital images of rocks: a new approach using multichannel classification, 919
 LeCheminant, G.M., Proceedings of the thirty-ninth annual meeting of the Mineralogical Association of Canada, 985
 Lengauer, C.L. with Giesler, G., 873
 Lescuyer, J.-L. with Marcoux, E., 159
 Lhotc, F. with Charoy, B., 226
 Li, Dien, Peng, Mingsheng & Bancroft, G.M., The vibrational spectra and structure of nordenskiöldine, 81
 Liang, Jian-Jie & Hawthorne, F.C., Characterization of fine-grained mixtures of rock-forming minerals by Rietveld structure refinement: olivine + pyroxene, 541
 Libowitzky, E., Optical anisotropy of cuprite caused by polishing, 353
 Lichte, F.E. with Foord, E.E., 839
 Liefink, D.J., Nijland, T.G. & Majer, C., The behavior of the rare-earth elements in high-temperature Cl-bearing aqueous fluids: results from the Ödbergdalen Verk natural laboratory, 149
 Liippo, J.P., Vuollo, J.J., Nykänen, V.M. & Piirainen, T.A., Geikieelite from the Näläntieni serpentinite massif, Kuhmo greenstone belt, Finland, 327
 Lindahl, I. with Grauch, R.L., 439
 Liu, Huifang, Chang, L.L.Y. & Knowles, C.R., The Mn isotype of andorite and uchucchacuate, 185
 Logan, M.A.V. with Schalamuk, I.B., 667
 Lord, R.A. with Pritchard, H.M., 271
 Lu, G. with Henry, D.J., 599
 Lustenhouwer, W.J. with Dobbe, R.T.M., 179
 MacDonald, D.J. with Burns, P.C., 31
 MacKay, R.M. with Clarke, D.B., 815
 Majer, C. with Liefink, D.J., 149
 Majzlan, J. with Uher, P., 319
 Mandarino, J.A., New minerals recently approved by the Commission on New Minerals and Mineral Names, 723
 Mandarino, J.A. with Wagner, F.E., 189
 Manning, P.G., Murphy, T.P. & Prepas, E.E., Forms of iron and the bioavailability of phosphorous in eutrophic Amisk Lake, Alberta, 459
 Manning, P.G. & Wang, Xiaowa, Ferric iron and the binding of phosphorus, lead and carbon in river particulate matter, 211
 Marcoux, E. & Lescuyer, J.-L., Les minéraux sulfo-arsénés aurifères de Salsigne, Aude, France: évolution paragénétique d'une minéralisation tardihercynienne synctectonique en contexte sédimentaire, 159
 Mason, R.A. with Brown, D., 105
 Maynard, J. with Pritchard, H.M., 271
 McCabe, C. with Henry, D.J., 599
 McDonald, A.M., Chao, G.Y. & Grice, J.D., Abenakite-(Ce), a new silico-phosphate-carbonate mineral from Mont Saint-Hilaire, Quebec: description and structure determination, 843
 McSwiggen, P.L., Morey, G.B. & Cleland, J.M., The origin of aegirine in iron formation of the Cuyuna Range, east-central Minnesota, 589
 Medenbach, O. with Effenberger, H., 365
 Mengel, F. & Rivers, T., Metamorphism of pelitic rocks in the Paleoproterozoic Ramah Group, Sagkeet area, northern Labrador: mineral reaction, P-T conditions and influence of bulk composition, 781
 Meyer, H.O.A., Waldman, M.A. & Garwood, B.L., Mantle xenoliths from kimberlite near Kirkland Lake, Ontario, 295
 Michailidis, K. with Kassoli-Fournarakis, A., 607
 Mitchell, R.H. with Clarke, D.B., 815
 Mittwede, S.K., Primary scapolite in a granitic pegmatite, western Cherokee County, South Carolina, 617
 Morey, G.B. with McSwiggen, P.L., 589
 Mozgovaya, N.N., Nenasheva, S.N., Borodave, Y.S. & Yudovskaya, M.A., Nuffeldite from the Maleevskoe massive sulfide deposit, Russia, 359
 Murphy, T.P. with Manning, P.G., 459
 Nelen, J.A. with Evans, H.T., Jr., 339
 Nenasheva, S.N. with Mozgovaya, N.N., 359
 Ni, Yunxiang with Wang, Liben, 865
 Nicholls, J. & Gordon, T.M., Procedures for the calculation of axial ratios on Pearce element ratio diagrams, 969
 Nijland, T.G. with Lieftink, D.J., 149
 Noronha, F. with Charoy, B., 226
 Novák, M. with Cooper, M., 903
 Nunes, J.E.L. & Gomes, C.L., The crystal chemistry of spodumene in some granitic aplite-pegmatite bodies of northern Portugal: a comparative review, discussion, 223
 Nurki, T. with Takagi, T., 747
 Nykänen, V.M. with Liippo, J.P., 327
 Oberti, R. with Caucia, F., 477
 Oberti, R. with Hawthorne, F.C., 491, 714
 Pan, Yuanming, Fleet, M.E. & Barnett, R.L., Rare-earth mineralogy and geochemistry of the Mattagami Lake volcanicogenic massive sulfide deposit, Quebec, 133
 Pan, Yuanming, Fleet, M.E. & Ray, G.E., Scapolite in two Canadian gold deposits: Nickel Plate, British Columbia, and Hemlo, Ontario, 825
 Peacock, D.R. with Rouse, R.C., 43
 Peeters, O.M. with Vochten, R., 553
 Peng, Mingsheng with Li, Dien, 81
 Percival, T.J. & Radtke, A.S., Sedimentary-rock-hosted disseminated gold mineralization in the Alas district, Macedonia, 649
 Pereira, M.D. & Bea, F., Cordierite-producing reactions in the Peña Negra Complex, Avila batholith, central Spain: the key role of cordierite in low-pressure anatexis, 763
 Petříček, V. with Effenberger, H., 365
 Piirainen, T.A. with Liippo, J.P., 327
 Pivec, E. with Ulrych, J., 637
 Post, J.E. with Evans, H.T., Jr., 339
 Povondra, P. with Ulrych, J., 637
 Prepas, E.E. with Manning, P.G., 459
 Pritchard, H.M., Ixer, R.A., Lord, R.A., Maynard, J. & Williams, N., Assemblages of platinum-group minerals and sulfides in silicate lithologies and chromite-rich rocks within the Shetland ophiolite, 271
 Radtke, A.S. with Percival, T.J., 649
 Ragu, A., Helvite from the French Pyrénées as evidence for granite-related hydrothermal activity, 111
 Raudsepp, M. with Boschmann, K.F., 21
 Ray, G.E. with Pan, Yuanming, 825
 Redhammer, G. with Giesler, G., 873
 Rivers, T. with Mengel, F., 781
 Robbie, R.A., Seal, R.R., II & Hemingway, B.S., Heat capacity and entropy of bornite (Cu₂FeS₄) between 6 and 760 K and the thermodynamic properties of phases in the system Cu-Fe-S, 945
 Robinson, G.W. with Ercit, T.S., 567
 Roeder, P.L., Chromite from the fiery rain of chondrules to the Kilauea Iki lava lake, 729
 Ross, D.R. with Evans, H.T., Jr., 339
 Rotura, A. with Clarke, D.B., 623
 Rouse, R.C., Peacock, D.R., Dunn, P.J., Su, Shu-Chun, Chi, P.H. & Yeates, H., Samowafite, a new Ca Mn Zn berylliosilicate mineral from Franklin, New Jersey: its characterization and crystal structure, 43
 Russell, J.K., Groat, L.A. & Halleran, A.A.D., IREE-rich niobian titanite from Mount Bisson, British Columbia: chemistry and exchange mechanisms, 575
 Rutšek, J. with Ulrych, J., 637
 Sawicki, J.A. with Wagner, F.E., 189
 Schalamuk, I.B. & Logan, M.A.V., Polymetallic Ag-Te-bearing paragenesis of the Cerro Negro District, Famatina Range, La Rioja, Argentina, 667
 Schenck, H. with Dobbe, R.T.M., 179
 Scott, S.D. with Ueno, T., 203
 Seal, R.R., II with Robbie, R.A., 945
 Sheriff, B.L. with Teeter, D.K., 69
 Sheriff, B.L. with Xu, Zhi, 935
 Sitak, J. with Ulrych, J., 637
 Sjoberg, J.J. with Hibbard, M.J., 307
 Smelik, E.A. & Veblen, D.R., Complex exsolution in glaucophane from Tilotton Peak, north-central Vermont, 233
 Su, Shu-Chun with Rouse, R.C., 43
 Sutley, S.J. with Foord, E.E., 839
 Takagi, T. & Nureki, T., Two T-(F)O₃ paths in the Myoken-zan magnetite-bearing granitic complex, San'yo belt, southwestern Japan, 747
 Taylor, M.C. with Cooper, M., 903
 Teeter, D.K., Sheriff, B.L., Xu, Zhi & Černý, P., MAS and DOR NMR study of Al-Si order in the analcime-pollucite series, 69
 Turnock, A.C. with Boschmann, K.F., 21
 Uehara, S. & Kamata, K., Antigorite with a large supercell from Saganoseki, Oita Prefecture, Japan, 93
 Ueno, T. & Scott, S.D., Phase relations in the system Ga-Fe-S at 900°C and 800°C, 203

- Uher, P., Chovan, M. & Majzlan, J., Vanadian-chromian garnet in mafic pyroclastic rocks of the Malé Karpaty Mountains, western Carpathians, Slovakia, 319
- Ulrych, J., Povondra, P., Pivec, E., Rutšek, J. & Sitek, J., Compositional evolution of metasomatic garnet in melilitic rocks of the Osečná complex, Bohemia, 637
- Ungarotti, L. with Caucia, F., 477
- Ungarotti, L. with Hawthorne, F.C., 491, 714
- Van Haverbeke, L. with Vochten, R., 553
- Van Springel, K. with Vochten, R., 553
- Van Velthuizen, J. with Ercit, T.S., 855
- Van Velthuizen, J. with Grice, J.D., 333, 405
- Veblen, D.R. with Smelci, E.A., 233
- Vochten, R., Van Haverbeke, L., Van Springel, K., Blaton, N. & Peeters, O.M., the structure and physicochemical characteristics of a synthetic phase compositionally intermediate between liebigite and andersonite, 553
- Vuollo, J.I. with Liippo, J.P., 327
- Wagner, F.E., Sawicki, J.A., Friedl, J., Mandarino, J.A., Harris, D.C. & Cabri, L.J., ^{197}Au Mössbauer study of the gold-silver ditellurides sylvanite, krennerite and calaverite, 189
- Waldbauer, M.A. with Meyer, H.O.A., 295
- Wang, Liben, Ni, Yunxiang, Hughes, J.M., Bayliss, P. & Drexler, J.W., The atomic arrangement of synchysite-(Ce), $\text{CeCaF}(\text{CO}_3)_2$, 865
- Wang, Xiaowa with Manning, P.G., 211
- Williams, N. with Prichard, H.M., 271
- Wood, S.A. with Cook, N.J., 703
- Xu, Zhi & Sheriff, B.L., ^{23}Na ^{27}Al ^{9}Be ^{29}Si solid state NMR study of tugtupite, 935
- Xu, Zhi with Teetstra, D.K., 69
- Yeates, H. with Rouse, R.C., 43
- Yudovskaya, M.A. with Mozgovaya, N.N., 359
- Zakrzewski, M.A. with Dobbé, R.T.M., 179
- Zecchini, P. with Ausiscchio, C., 55

SUBJECT INDEX

A refinement of the structure of ferritungsite from Kalzas Mountain, Yukon, and observations on the tungsten pyrochlorites, (Ercit & Robinson), 567
 A-site disorder in synthetic fluor-edenite: a crystal-structure study, (Boschmann *et al.*), 21
 Abenakiite-(Ce), a new silicophosphate carbonate mineral from Mont Saint-Hilaire, Quebec: description and structure determination, (McDonald *et al.*), 843
 An occurrence of sectoried birefringence in almandine garnet, (Brown & Mason), 105
 Antigorite with a large supercell from Saganoseki, Oita Prefecture, Japan, (Uehara & Kamata), 93
 Argentian-pentlandite-bearing assemblages in metamorphic rocks of the KTB pilot hole, Oberpfalz, Germany, (Kontny *et al.*), 803
 Assemblages of platinum-group minerals and sulfides in silicate lithologies and chromite-rich rocks within the Shetland ophiolite, (Prichard *et al.*), 271
 ^{197}Au Mössbauer study of the gold-silver ditellurides sylvanite, krennerite and calaverite, (Wagner *et al.*), 189
 Characterization of fine-grained mixtures of rock-forming minerals by Rietveld structure refinement: olivine + pyroxene, (Liang & Hawthorne), 541
 Characterization of the $\text{FeSO}_4 \cdot \text{H}_2\text{O} - \text{CuSO}_4 \cdot \text{H}_2\text{O}$ solid-solution series, and the nature of poitevinit, $(\text{Cu},\text{Fe})\text{SO}_4 \cdot \text{H}_2\text{O}$, (Giesler *et al.*), 873

CHEMICAL ANALYSES (see also Electron-microprobe analyses)

Minerals

beryl, 56, høgtuvaite, 445, nordenskiöldine, 82, orpiment, 659, realgar, 659, stibnite, 659

Rocks

albite pod, 694, allanite-bearing granitic pegmatite, 577, antimonian gold ore, 653, argillite altered dolomite, 655, argillite altered marble, 655, argillite altered tuff, 655, arsenian gold ore, 655, chlorite, 140, dolomite, 655, gabro, 694, gneiss, 445, 618, granodiorite, 752, 766, kimberlite, 297, leucogranite, 766, marble, 655, migmatite, 766, monzonogranite, 752, olivine gabro, 694, pegmatite, 445, 577, 617, pelitic schist, 786, quartz monzodiorite, 752, quartz monzonite, 752, rhyolite, 140, silicified dolomite gold ore, 653, silicified marble gold ore, 655, silicified tuff gold ore, 655, stibnite-bearing jasperoid, 655, talc-actinolite, 140, tonalite, 752, Trent River particulates, 216, tuff, 655

Chemical composition of tourmaline in quartz veins from Nea Roda and Thasos areas in Macedonia, northern Greece, (Kassoli-Fournarakis & Michailidis), 607

Chromite: from the fiery rain of chondrules to the Kilauea Iki lava lake, (Roeder), 729

Complex exsolution in glaucophane from Tillotson Peak, north-central Vermont, (Smelci & Veblen), 233

Compositional evolution of metasomatic garnet in melilitic rocks of the Osečná complex, Bohemia, (Ulrych *et al.*), 637

Cordierite-producing reactions in the Peña Negra Complex, Avila batholith, central Spain: the key role of cordierite in low-pressure anatexis, (Pereira & Bea), 763

COUPLED-ATOM SUBSTITUTIONS

Oxides

columbite, 427, ferritungsite, 570, tungsten pyrochlore, 570

Silicates

amigmatite group compositional exchange-vectors, 449, andradite, 644, antigorite, 100, berthierine, 601, beryl, 56, cummingtonite, 248, epigenetic tourmaline, 601, glaucophane, 248, melanite, 644, niobian titanite, 578, staurolite, 478, 493, tourmaline, 601, 611, vesuvianite, 497, 516

Sulfides

andrite-uchucchacauite solid solution, 187, djerfisherite, 817, nuffieldite, 360, uchucchacauite, 185

CRYSTALLOGRAPHY (see also Twinning)

amigmatite group, 443, 449, almandine birefringence, 105, analcime, 70, aurorite, 336, B-O bond force constant, 84, beryl, 55, C-O bond force constant, 84, chalcophanite, 336, cleurosite, 259, Cl in borate structures, 12, Cl in scapolite, 833, columbite-group geochemistry, 431, compositional exchange-vectors, 449, crystallographically symmetrical hydrogen bond in borates, 892, dehydrogenation, 477, dehydroxylation, 87, djerfisherite, 820, electronic polarizability, 910, hydrogen bonding, 485, 503, 518, 538,

høgtuvaite, 445, interfacial elastic-strain energy calculation, 250, Jahn-Teller distortion, 397, 881, kieserite group, 873, lone-pair electrons, 377, 528, Pavlen-type chrysotile, 258, point-dipole theory, 909, poitevinit, 875, pollucite, 70, polygonal serpentine, 267, pyrochlore substitutions, 416, Rietveld structure refinement, 339, 381, 541, 875, S^{4+}O_2 group in abenakiite-(Ce), 848, staurolite dehydrogenation, 477, synchysite, 870, tourmaline site-speciation, 35, tugtupite, 935, tungsten pyrochlore, 570, vesuvianite, 497, 509, (Zn,Be) solid solution, 50

CRYSTAL STRUCTURE (see also X-ray diffraction)

abenakiite-(Ce), 845, corvusite, 339, dehydroxylated muscovite, 88, diopside, 542, elbaite, 31, fernandinite, 339, ferritungsite, 567, fluor-edenite, 21, fredrikssonite, 397, gagarinite-(Y), 563, gaufite, 857, humbertonite, 381, inderborgite, 533, kalbitone, 885, kalipyrochlore, 415, kiesfite, 182, kieserite group, 878, kulanite, 15, mrázekite, 368, olivine, 542, petersenite-(Ce), 407, poitevinit, 878, preobrazhenskite, 387, pringleite, 1, ruttenbergite, 1, samowflerite, 46, staurolite, 477, 491, synchysite-(Ce), 866, synthetic (Ca,Na)-uranyl carbonate, 556, tugtupite, 935, tunellite, 895, tusionite, 904, vesuvianite, 497, wherryite, 373, wickenburgite, 525

Crystal-structure refinement of hydrogen-rich staurolite, (Hawthorne *et al.*), 491
 Determination of the megastructures of the borate polymorphs pringleite and ruttenbergite, (Grice *et al.*), 1

ELECTRON-DIFFRACTION PATTERNS

antigorite, 97

ELECTRON-MICROPROBE ANALYSES

abenakiite-(Ce), 844, actinolite, 152, 693, 754, acgririne, 595, albite, 689, allanite, 135, almandine, 108, 628, altaite, 669, analcime, 72, andorite-uchucchacauite solid solution, 187, andradite, 642, ankerite, 676, anthoite, 569, antigorite, 99, apatite, 152, argentian pentlandite, 809, arsenian pyrite, 659, arsénopyrite, 169, augite, 752, Ba-K feldspar, 689, berthierine, 602, biotite, 693, 755, 770, 788, calaverite, 191, chalcopyrite, 169, 809, chlorite, 325, 705, 788, chloritoid, 788, chromite, 330, clinopyroxene, 152, 684, cobaltian ponlandite, 809, columbite, 426, cordierite, 768, corvusite, 342, cummingtonite, 237, diopside, 542, diopside (aluminian), 301, diopside (chromian), 299, djerfisherite, 819, elbaite, 35, enstatite, 752, epigenetic tourmaline, 602, ermenekelite, 335, euxenite, 136, ferberite, 569, fernandinite, 342, ferritungsite, 569, ferroan rhodochrosite, 676, fluor-edenite, 25, fredrikssonite, 399, freibergite, 673, gagarinite-(Y), 564, gainesite, 842, garnet, 628, 642, 774, 788, gaufite, 857, gelkite, 330, geversite, 274, glaucophane, 238, hellandite, 136, helvite, 117, hornblende, 152, 693, 754, hydromica, 325, høgtuvaite, 444, illite, 602, ilmenite, 705, 756, 774, kalipyrochlore, 416, kiesfite, 181, krennerite, 191, kulanite, 10, magnetite, 330, 756, mircillite, 842, melanite, 642, micromelerite, 707, microcline, 619, monazite, 136, 153, moncheite, 707, mrázekite, 367, muscovite, 788, nickel antimonide-(Cu,Pd), 274, niobian ilmenite, 580, niobian titanite, 579, nordenskiöldine, 82, nuffieldite, 362, olivine, 299, 312, 330, 542, 692, parsite, 136, pentlandite, 706, 809, petalite, 225, petersenite-(Ce), 407, phlogopite, 152, 301, plagioclase, 312, 619, 689, 829, pollucite, 72, polycrasc, 136, pyrite, 706, 809, pyrope, 299, pyrrhotite, 169, 706, 809, russelite, 569, samowflerite, 46, scapolite, 620, 829, scheelite, 569, selwayite, 842, siderite, 676, sillimanite, 774, sphalerite, 169, 674, spinel, 301, spodumene, 225, staurolite, 478, 493, 788, sylvanite, 191, synchysite, 136, synthetic $\text{Ag}_2\text{Mn}_2\text{Sb}_5\text{S}_2$, 187, synthetic $\text{Ag}_2\text{Mn}_2\text{Sb}_5\text{S}_17$, 187, synthetic hornite, 947, synthetic (Ca,Na)-uranyl carbonate, 553, tellurium, 674, titaniferous magnetite, 312, tourmaline, 602, 610, 619, tremolite, 325, 705, tusionite, 904, unnamed PbAsTe_2 , 674, unnamed $(\text{Pt},\text{Pb})\text{Bi}_3(\text{S},\text{Se})_{4-x}$, 708, vanadian-chromian garnet, 323, vanadian-chromian hydromica, 325, vesuvianite, 501, 508, violarite, 706, xenotime, 153, zircon, 136

Electronic polarizability of oxygen and various cations in selected triclinic minerals: point-dipole theory, (Abbott), 909

Energy calculations bearing on the dehydroxylation of muscovite, (Abbott), 87
 Epigenetic tourmaline in sedimentary red-beds: an example from the Silurian

Ross Hill Formation, Virginia, (Henry *et al.*), 599

Ermenekelite, $\text{NiMn}_2\text{O}_7 \cdot 3\text{H}_2\text{O}$, a new mineral species from the Siberia complex, Western Australia: comments on the crystallography of the chalcophanite group, (Grice *et al.*), 333

Excess Y-group cations in the crystal structure of vesuvianite, (Groat *et al.*), 497

EXPERIMENTAL (see also Petrology)

Computer Programs

EPLAG9, 243, OPT, 911, OPTRFN, 917

General

adsorption capacity of hydrated ferric oxides, 211, aluminum NMR, 74, 940, ¹⁹Au Mössbauer spectroscopy, 189, beryllium NMR, 938, bioavailable phosphorus, 459, bond force-constants, 84, bornite heat capacity and entropy, 945, bornite synthesis, 946, cathodoluminescence, 150, cesium NMR, 76, compositional exchange-vectors in the aenigmatite group, 449, differential scanning calorimetry, 948, digital imaging of rocks, 919, double rotation NMR, 935, electron channeling pattern, 354, electronic polarizability, 910, energy calculations for dehydroxylation, 88, fluoredenite synthesis, 22, Gibbs free energy of formation for Cu-Fe-S phases, 945, interfacial elastic-strain energy calculation, 250, laser ablation, 169, magic-angle spinning NMR, 935, Mössbauer spectra, 192, 213, 460, 880, Mössbauer spectra of ferric iron in lake sediments, 460, NMR analysis, 69, 935, optimal phase boundaries, 243, Pearce element-ratio diagrams, 699, point-dipole theory, 909, pollicite synthesis, 71, silicon NMR, 72, 937, sodium NMR, 75, 938, SREF analysis, 35, synthetic (Ca,Na)-uranyl carbonate, 553, zinc distribution coefficients, 121

Stable Isotopes

carbon, 151, oxygen, 151

System

$\text{Ag}_2\text{S}-\text{MnS}-\text{Sb}_2\text{S}_3$, 185, Ga-Fe-S, 203, Cu-Fe-S, 945

Ferric iron and the binding of phosphorus, lead and carbon in river particulate matter, (Manning & Wang), 211

Forms of iron and the bioavailability of phosphorus in eutrophic Amisk Lake, Alberta, (Manning *et al.*), 459

Garnet-forming and garnet-eliminating reactions in a quartz diorite intrusion at Capo Vaticano, Calabria, Italy, (Clarke & Rottura), 623

Gaultite, a new zeolite-like mineral from Mont Saint-Hilaire, Quebec, and its crystal structure, (Ercit & Van Velthuizen), 855

Geikielite from the Nältäniemi serpentine massif, Kuhmo greenstone belt, Finland, (Liippo *et al.*), 327

Heat capacity and entropy of bornite (Cu_2FeS_4) between 6 and 760 K and the thermodynamic properties of phases in the system Cu-Fe-S, (Robie *et al.*), 945

Hélvite from the French Pyrénées as evidence for granite-related hydrothermal activity, (Ragu), 111

Hydrogen bonding in tunellite, (Burns & Hawthorne), 895

Högstuvaite, a new beryllian member of the aenigmatite group from Norway, with new X-ray data on aenigmatite, (Grauch *et al.*), 439

INFRARED-ABSORPTION SPECTRA

beryl, 55, dolomite, 83, gaultite, 857, kaliborite, 893, nordenskiöldine, 81, preobrazhenskite, 394, vanadian-chromian garnet, 322

Infrared spectroscopy and crystal chemistry of the beryl group, (Aurisicchio *et al.*), 55

Jahn-Teller distorted Mn^{3+}O_6 octahedra in fredrikssonite, the fourth polymorph of $\text{Mg}_2\text{Mn}^{3+}\text{Si}_2\text{O}_5$, (Burns *et al.*), 397

Kaliborite: an example of a crystallographically symmetrical hydrogen bond, (Burns & Hawthorne), 885

Kieftite, CoS_2 , a new member of the skutterudite group from Tunaberg, Sweden, (Dobbe *et al.*), 179

Les minéraux sulfo-arsénites aurifères de Salsigne, Aude, France: évolution paragénétique d'une minéralisation tardい-hercynienne syntectonique en contexte sédimentaire, (Marcoux & Lescuyer), 159

LREE-rich niobian titanite from Mount Bissou, British Columbia: chemistry and exchange mechanisms, (Russell *et al.*), 575

Mantle xenoliths from kimberlite near Kirkland Lake, Ontario, (Meyer *et al.*), 295

MAS and DOR NMR study of Al-Si order in the analcime–pollicite series, (Teertstra *et al.*), 69

Mccrillsite, $\text{NaCs}(\text{Be},\text{Li})\text{Zr}_2(\text{PO}_4)_4 \cdot 1\text{-H}_2\text{O}$, a new mineral species from Mount Mica, Oxford County, Maine, and new data for gainesite, (Foord *et al.*), 839

Metamorphism of pelitic rocks in the Paleoproterozoic Ramah Group, Sagick area, northern Labrador: mineral reaction, P-T conditions and influence of bulk composition, (Mengel & Rivers), 781

MICROHARDNESS

kieftite, 182

MINERAL DATA (see also Electron-microprobe analyses)

abenakiite-(Ce), 843, acanthite, 671, actinolite, 152, 235, 754, aegirine, 589, aenigmatite, 443, aenigmatite group, 443, 449, albite, 914, allanite, 135, allocasite, 276, almandine, 105, 628, altite, 669, analcite, 72, andersonite, 553, andorite-uchucchacuaita solid solution, 187, andradite, 642, anilite, 945, ankerite, 676, antiohite, 569, antigorite, 93, apatite, 152, argantanite, 803, argyrodite, 673, arsenian pyrite, 659, arsenopyrite, 169, augite, 312, 752, aurrite, 335, Ba-K feldspar, 689, berthierine, 600, beryl, 55, biotite, 693, 755, 769, 795, bornite, 945, calaverite, 191, cesian analcime, 70, chalcocite, 945, chalcopyrite, 335, chalcopyrite, 169, 945, chlorite, 325, 705, 795, chloritoid, 795, chromeite, 729, chrysotile, 259, clinopyroxene, 152, 312, cobaltian pentlandite, 809, columbite, 426, cordierite, 767, corusite, 339, covellite, 945, cummingtonite, 235, cuprite, 353, dehydroxylated muscovite, 88, diopside (aluminian), 301, diopside (chromian), 299, djerfisherite, 815, dolomite, 83, elbaite, 31, electron, 170, emstatite, 752, epigenetic tourmaline, 601, ernienickelite, 333, euxenite, 136, ferberite, 569, fernandinite, 339, ferritungstite, 567, ferroan rhodochrosite, 676, fluor-edenite, 21, fredrikssonite, 397, freibergerite, 673, gagarinit-(Y), 563, gainesite, 842, galena, 675, garnet, 628, 642, 772, 795, gaultite, 855, gelkite, 327, geversite, 274, glaucophane, 235, gold, 170, goldmanite, 319, gustavite,

167, hellandite, 136, helvite, 111, hornblende, 152, 692, 754, humbertonite, 381, hydromica, 322, högtuvitaite, 439, 449, ilrite, 602, ilmenite, 705, 756, 772, inderborite, 533, irarsite, 287, kaliborite, 885, kalipyrochlore, 415, kieftite, 179, kieserite group, 873, kobellite, 167, krennerite, 191, kulanite, 15, kyanite, 912, laurite, 287, liebigite, 553, magnetite, 729, 750, 756, maccrillsite, 842, melanite, 642, michenerite, 707, microcline, 913, monazite, 136, 153, moncheite, 707, mražekite, 365, muscovite, 88, 795, nickel antimonide-(Cu,Pd), 274, niobian ilmenite, 580, niobian titanite, 575, nordenskiöldine, 81, nuffieldite, 359, nukundamite, 945, olivine, 299, 312, orpiment, 659, osmium, 287, parsite, 136, petalite, 225, petersenite-(Ce), 405, phlogopite, 152, 301, poitevinit, 873, pollicite, 72, polycrase, 136, preobrazhenskite, 387, pringleite, 1, proustite, 671, Pt oxide, 275, Pt-Fe-Cu alloy, 279, pyrargyrite, 671, pyrope, 299, pyrophyte, 169, realgar, 659, ruitenbergite, 1, russelite, 569, samfowlerite, 43, scapolite, 617, 825, scheelite, 569, schizolite, 913, selvynite, 842, siderite, 676, stilianite, 772, sphalerite, 169, 674, spinel, 301, 729, spodumene, 225, stauroite, 478, 491, 713, 714, 796, stibopylladinite, 287, stibnite, 659, sylvanite, 191, synchisite, 136, synchysite-(Ce), 866, synthetic $\text{Ag}_2\text{Mn}_2\text{Sb}_5\text{I}_2$, 187, synthetic $\text{Ag}_2\text{Mn}_2\text{Sb}_5\text{Se}_2$, 187, synthetic (Ca,Na)-uranyl carbonate, 553, synthetic uchucchacuaita, 187, tellurite, 674, titanite, 141, 575, tourmaline, 35, 601, 610, tremolite, 325, 705, tugtupite, 935, tunellite, 895, tungsten pyrochlore, 568, tusionite, 904, unnamed PbAsTe_2 , 674, unnamed Pt-Te, 285, unnamed $(\text{Pt},\text{Pb})\text{Bi}_3(\text{S},\text{Se})_{4-x}$, 708, vanadian-chromian garnet, 319, vanadian-chromian hydromica, 322, vesuvianite, 497, 505, violarite, 706, walstromite, 914, wherryite, 373, wickenburgite, 525, winchite, 247, wollastonite, 912, xenotime, 153, zircon, 136

Mineral recognition in digital images of rocks: a new approach using multi-channel classification, (Launeau *et al.*), 919

MINERALOGICAL ASSOCIATION OF CANADA

Berry medal (Sabina), 988, book reviews, 227, 469, 717, 979, colour photographs: digital images of rocks, 920, 926, Hawley medal (Hawthorne, Ungarotti, Oberti, Caucia & Callegari), 986, Past Presidents' medal (Mitchell), 990, Presidential address, 729, proceedings of the 39th annual meeting, 985

²³Na ²⁷Al ¹⁹Be ²⁹Si solid state NMR study of tugtupite, (Xu & Sherriff), 935

NEW MINERAL SPECIES

1992 listing of IMA-approved new minerals, 723, abenakiite-(Ce), 843, ernienickelite, 333, gaultite, 855, högtuvitaite, 439, kieftite, 179, maccrillsite, 839, petersenite-(Ce), 405, samfowlerite, 43, unnamed $(\text{Pt},\text{Pb})\text{Bi}_3(\text{S},\text{Se})_{4-x}$, 708

New minerals recently approved by the Commission on New Minerals and Mineral Names, (Mandarino), 723

NOMENCLATURE

abenakiite-(Ce), 843, ernienickelite, 333, gainesite group, 842, gaultite, 855, högtuvitaite, 439, kieftite, 179, kieserite group, 873, kulanite, 15, maccrillsite, 839, petersenite-(Ce), 405, poitevinit, 873, pringleite, 1, ruitenbergite, 1, samfowlerite, 45, silicophosphates, 853, tungsten pyrochlore, 572, unnamed $(\text{Pt},\text{Pb})\text{Bi}_3(\text{S},\text{Se})_{4-x}$, 708

Nuffieldite from the Maleevskoe massive sulfide deposit, Russia, (Mozgova *et al.*), 359

Occurrence and origin of djerfisherite from the Elwin Bay kimberlite, Somerset Island, Northwest Territories, (Clarke *et al.*), 815

Optical anisotropy of cuprite caused by polishing, (Libowitzky), 353

OPTICAL PROPERTIES

General

abenakiite-(Ce), 844, albite, 914, almandine, 106, andradite, 644, chloritoïte, 915, clinochlore, 915, ernienickelite, 334, gaultite, 856, goldmannite-uvareto solid solution, 320, högtuvitaite, 443, kaolinite, 915, kyanite, 912, maccrillsite, 841, melanite, 644, microcline, 913, mražekite, 366, petersenite-(Ce), 406, pyrophyllite, 915, samfowlerite, 45, schizolite, 913, synthetic (Ca,Na)-uranyl carbonate, 555, talc, 915, walstromite, 914, wollastonite, 912

Reflectance

cuprite, 353, kieftite, 182, nuffieldite, 360, unnamed $(\text{Pt},\text{Pb})\text{Bi}_3(\text{S},\text{Se})_{4-x}$, 709

Origin of albite pods in the Geordie Lake gabbro, Port Coldwell alkaline complex, northwestern Ontario: evidence for late-stage hydrothermal Cu-Pd mineralization, (Good & Crocket), 681

Partitioning of zinc among common ferromagnesian minerals and implications for hydrothermal mobilization, (Johnson), 121

Petersenite-(Ce), a new mineral from Mont Saint-Hilaire, and its structural relationship to other REE carbonates, (Grice *et al.*), 405

PETROLOGY (see also Experimental)

Al-Si order in analcime–pollicite, 77, Al-Si order in muscovite, 91, albite pods, 684, alkali fractionation in plagioclase, 655, allanite-bearing granitic pegmatite, 577, Allchar, Macedonia Au-As-Sb-Tl-Hg mineralization, 649, almandine birefringence, 105, anatexic migmatite, 764, apatite veins, 150, argantanite, 810, argillic alteration in gold deposits, 653, 671, blueschist, 234, Carlin-type gold deposits, 650, cellular augite, 312, chondrite-normalized REE data, 139, 154, 583, 643, 597, chondrules, 739, chromitite, 276, Cl in apatite, 155, Cl in scapolite, 826, columbite-group geochemistry, 431, cordierite-producing reactions, 763, dehydroxylation of muscovite, 88, djerfisherite, 819, epigenetic tourmaline, 599, F in hornblende, 692, fluid inclusion data, 660, 674, 829, garnet-eliminating reactions, 623, garnet-forming reactions, 623, 793, geobarometry, 301, 596, 757, geothermometry, 301, 596, 660, 674, 732, 757, 797, glaucophane

- exsolution, 234, gold-skarn, 826, goldmanite–uvarovite solid solution, 319, harzburgite, 276, 303, humic acid dissolution of PGE, 957, hydrated ferric oxides, 211, incongruent melting, 307, kimberlite, 295, 737, 817, limburgite, 307, LREE in titanite, 376, magnetite-series granitic rocks, 748, mantle xenoliths, 295, metamorphic evolution, 763, 782, migmatite, 764, ophiolite complex, 272, optical anisotropy of cuprite, 353, organic matter in soil, 959, oxygen fugacity, 757, pelitic schist, 786, PGE concentration, 287, 699, PGE in supergene environments, 963, PGM assemblages, 272, 682, 703, primary scapolite in granitic pegmatite, 617, REE geochemistry, 133, 149, 376, 694, REE mobility, 144, 156, 694, remobilized PGE, 290, 710, 957, secondary PGM, 289, serpentineite, 94, 289, 327, Sheland ophiolite PGM, 272, spinel gap, 734, sulfur fugacity, 811, ultramafic xenoliths, 297, VMS deposit, 133, xenoliths, 295, 737, 817, 844, 856, zinc partitioning in ferromagnesian minerals, 121, zirconium-rich garnet, 645
- Phase relations in the system Ga–Fe–S at 900°C and 800°C, (Ueno & Scott), 203
 Platinum-group minerals in the Lac Sheen Cu–Ni–PGE prospect, Quebec, (Cook & Wood), 703
 Polymetallic Ag–Te-bearing paragenesis of the Cerro Negro District, Famatina Range, La Rioja, Argentina, (Schalamuk & Logan), 667
 Primary scapolite in a granitic pegmatite, western Cherokee County, South Carolina, (Mittwede), 617
 Procedures for the calculation of axial ratios on Pearce element-ratio diagrams, (Nicholls & Gordon), 969
 Proceedings of the thirty-ninth annual meeting of the Mineralogical Association of Canada, (LeCheminant), 985
- RAMAN SPECTRA**
 dolomite, 83, nordinisköldine, 83
- Rare-earth mineralogy and geochemistry of the Mattagami Lake volcanogenic massive sulfide deposit, Quebec, (Pan *et al.*), 133
 Refinement of the crystal structure of kulanite, (Cooper & Hawthorne), 15
 Refinement of the structure of gagarinite-(Y), $\text{Na}_x(\text{Ca}_x\text{REE}_{2-x})\text{F}_6$, (Hughes & Drexler), 563
 Revision of the crystal structure of mřázeckite, $\text{Bi}_2\text{Cu}_3(\text{OH})_2\text{O}_2(\text{PO}_4)_2\text{H}_2\text{O}$, (Effenberger *et al.*), 365
 Samfowlerite, a new Ca Mn Zn beryllosilicate mineral from Franklin, New Jersey: its characterization and crystal structure, (Rouse *et al.*), 43
- SCANNING-ELECTRON MICROGRAPHS**
 allanite, 138, altaite, 674, berthierine, 600, bismuth, 180, chondrules, 740, corvusite, 341, epigenetic tourmaline, 601, ernienickelite, 334, fernandinite, 341, gekielite, 329, gudmundite, 180, gustavite, 167, helvite, 116, kieftite, 179, kobellite, 167, magnetite, 750, monazite, 138, niobian ilmenite, 577, niobian titanite, 577, parsite, 138, PGM, 279, polycrase, 138, samarskite exsolved from columbite, 428, samfowlerite, 45, sperylite, 279, synchysite, 138, synthetic (Ca,Na)-uranyl carbonate, 554, synthetic $\beta\text{-Ga}_2\text{S}_3$, 205, synthetic $\text{Ga}_4\text{Fe}_2\text{S}_9$, 206, synthetic $\text{Ga}_2(\text{Fe}_{22}\text{S}_{57})$, 207, synthetic $\sim\text{Ga}_{32}\text{Fe}_8\text{S}_{58}$, 206, synthetic Ga_3S , 205, synthetic α -iron, 207, tellurium, 674, vanadian-chromium garnet, 322
- Scapolite in two Canadian gold deposits: Nickel Plate, British Columbia, and Hemlo, Ontario, (Pan *et al.*), 825
 Sedimentary-rock-hosted disseminated gold mineralization in the Alsar district, Macedonia, (Percival & Radtke), 649
 Signs of incongruent melting of clinopyroxene in limburgite, Thetford Hill, Vermont, (Hibbard & Sjöberg), 307
 Structural aspects of oxidation – dehydrogenation of staurolite, (Caucia *et al.*), 477
 Structural variations in chrysotile asbestos fibers revealed by synchrotron X-ray diffraction and high-resolution transmission electron microscopy, (Cressey *et al.*), 257
 Structure and hydrogen bonding in inderborite, a heteropolyhedral sheet structure, (Burns & Hawthorne), 533
 Structure and hydrogen bonding in preobrazhenskite, a complex heteropolyhedral borate, (Burns & Hawthorne), 387
- TEXTURES**
 aegirine micronodules, 592, albite pods, 688, argentinian pentlandite, 806, berthierine, 600, cellular augite, 312, chondrules, 740, epigenetic tourmaline, 601, gold ore, 164, gustavite, 167, helvite, 114, kobellite, 167, limburgite, 309, primary scapolite in granitic pegmatite, 619, ultramafic xenoliths, 297
- The atomic arrangement of synchysite-(Ce), $\text{CeCaF}(\text{CO}_3)_2$, (Wang *et al.*), 865
 The behavior of the rare-earth elements in high-temperature Cl-bearing aqueous fluids: results from the Ødegårdens Verk natural laboratory, (Lieftink *et al.*), 149
 The crystal chemistry of manganese-bearing elbaite, (Burns *et al.*), 31
 The crystal chemistry of spodumene in some granitic aplite–pegmatite bodies of northern Portugal: a comparative review: discussion, (Nunes & Gomes), 223
 The crystal chemistry of spodumene in some granitic aplite–pegmatite bodies of northern Portugal: a comparative review: reply, (Charoy *et al.*), 226
 The crystal chemistry of staurolite: discussion, (Hollister), 713
- The crystal chemistry of staurolite: reply, (Hawthorne *et al.*), 714
 The crystal structure and crystal chemistry of fernandinite and corvusite, (Evans *et al.*), 339
 The crystal structure of humberstonite, a mixed sulfate–nitrate mineral, (Burns & Hawthorne), 381
 The crystal structure of tusionite, $\text{Mn}^{2+}\text{Sr}^{4+}(\text{BO}_3)_2$, a dolomite-structure borate, (Cooper *et al.*), 903
 The crystal structure of wherryite, $\text{Pb}_2\text{Cu}_2(\text{SO}_4)_4(\text{SiO}_4)_2(\text{OH})_2$, a mixed sulfate–silicate with $[\text{M}(\text{TO}_4)_2]_n$ chains, (Cooper & Hawthorne), 373
 The crystal structure of wickenburgite, $\text{Pb}_2\text{CaAl}[\text{AlSi}_{10}\text{O}_{27}](\text{H}_2\text{O})_3$, a sheet structure, (Lam *et al.*), 525
 The geochemistry and crystal chemistry of columbite-group minerals from granitic pegmatites, southwestern Grenville Province, Canadian Shield, (Ercit), 421
 The incorporation of boron into the vesuvianite structure, (Groat *et al.*), 505
 The Mn isotype of andorite and uchucchacuaite, (Liu *et al.*), 185
 The mobility of the platinum-group elements in the soils of the Freetown Peninsula, Sierra Leone, (Bowles *et al.*), 957
 The origin of aegirine in iron formation of the Cuyuna Range, east-central Minnesota, (McSwiggan *et al.*), 589
 The structural chemistry of kalipyrochlore, a “hydropyrochlore”, (Ercit *et al.*), 415
 The structure and physicochemical characteristics of a synthetic phase compositionally intermediate between liebigite and andersonite, (Vochten *et al.*), 553
 The vibrational spectra and structure of nordinisköldine, (Li *et al.*), 81
- THERMOGRAVIMETRIC ANALYSIS**
 poitevinit, 876, synthetic (Ca,Na)-uranyl carbonate, 554
- TRACE-ELEMENT DATA**
 albite pod, 694, allanite-bearing granitic pegmatite, 577, amphibolite, 325, antimonian gold ore, 655, apatite, 153, argillite altered dolomite, 655, argillite altered marble, 655, argillite altered tuff, 655, arsenian gold ore, 655, arsenian pyrite, 659, black shale, 325, chalcocite, 169, chlorite, 140, dolomite, 655, gabro, 694, galena, 675, In in chalcopyrite, 169, kimblerite, 297, marble, 655, monazite, 155, olivine gabbro, 694, orpiment, 659, PGE in ferricrete, 962, PGE in Freetown Layered Complex, 962, PGE in laterite, 962, phlogopite, 153, realgar, 659, REE in chlorite, 140, rhoylite, 140, scapolite, 153, silicified dolomite gold ore, 655, silicified marble gold ore, 655, silicified tuff gold ore, 655, sphalerite, 169, 675, stibnite, 659, stibnite-bearing asperoid, 655, talc–actinolite, 140, titanian andradite, 643, tuff, 655, xenotime, 155
- TRANSMISSION ELECTRON MICROGRAPHY**
 actinolite, 235, chrysotile, 261, cummingtonite, 235, glaucophane, 235, polygonal serpentine, 267, winchite, 247
- TWINNING** (see also Crystallography)
 almandine sector twinning, 105, ernienickelite, 335, hellandite, 140, högtuvaita, 440
- Two $\text{T}-\text{f}(\text{O}_2)$ paths in the Myoken-zan magnetite-bearing granitic complex, San yo belt, southwestern Japan, (Takagi & Nureki), 747
 Vanadian-chromium garnet in mafic pyroclastic rocks of the Malé Karpaty Mountains, western Carpathians, Slovakia, (Uher *et al.*), 319
 Vector representation of some mineral compositions in the aenigmatite group, with special reference to högtuvaita, (Burt), 449
- X-RAY DIFFRACTION** (see also Crystal Structure)
Cell Dimensions
 abenakiite-(Ce), 845, aenigmatite, 445, almandine, 108, andorite–uchucchacuaite solid solution, 187, antigorite, 96, aurorite, 335, calaverite, 190, chalcohanite, 335, columbite, 428, corvusite, 343, diopside, 543, elbaite, 32, ernienickelite, 335, fernandinite, 343, ferritungite, 369, fluoredenite, 22, frediksortite, 398, gagarinite-(Y), 564, gaufite, 858, goldmanite, 323, hellandite, 140, helvite, 115, humberstonite, 382, högtuvaita, 444, inderborite, 533, kalbitore, 886, kalipyrochlore, 416, kieftite, 181, kieserite group, 877, krennerite, 190, kulanite, 16, merrillite, 841, mřázeckite, 367, nordinisköldine, 82, nuffieldite, 361, olivine, 543, petalite, 225, petersenite-(Ce), 407, poitevinit, 877, preobrazhenskite, 388, pringleite, 2, ruitenbergite, 2, samfowlerite, 45, spodumene, 225, staurolite, 479, 492, sylvanite, 190, synchysite-(Ce), 866, synthetic $\text{Ag}_2\text{Mn}_2\text{Sb}_6\text{S}_{12}$, 187, synthetic bornite, 947, synthetic (Ca,Na)-uranyl carbonate, 553, synthetic $\text{Ga}_4\text{Fe}_2\text{S}_9$, 207, synthetic $\text{Ga}_2(\text{Fe}_{22}\text{S}_{57})$, 207, synthetic $\sim\text{Ga}_{32}\text{Fe}_8\text{S}_{58}$, 206, synthetic uchucchacuaite, 187, tunellite, 896, tusionite, 904, vanadian-chromium garnet, 323, vesuvianite, 498, 508, wherryite, 373, wickenburgite, 525
- Powder Data**
 abenakiite-(Ce), 845, aenigmatite, 447, aurorite, 335, chalcohanite, 335, chrysotile, 259, corvusite, 344, ernienickelite, 335, fernandinite, 344, gaufite, 857, humberstonite, 383, högtuvaita, 446, kieftite, 183, merrillite, 841, mřázeckite, 368, nuffieldite, 361, petersenite-(Ce), 408, poitevinit, 877, samfowlerite, 46, synthetic $\text{Ag}_2\text{Mn}_2\text{Sb}_6\text{S}_{12}$, 187, synthetic $\text{Ag}_2\text{Mn}_2\text{Sb}_6\text{S}_{17}$, 187, synthetic (Ca,Na)-uranyl carbonate, 560, synthetic $\text{Ga}_2\text{Fe}_2\text{S}_9$, 207, synthetic $\text{Ga}_2(\text{Fe}_{22}\text{S}_{57})$, 207, synthetic $\sim\text{Ga}_{32}\text{Fe}_8\text{S}_{58}$, 206, synthetic uchucchacuaite, 187

THE CANADIAN MINERALOGIST

**Journal of the
Mineralogical Association
of Canada**



R.F. Martin, Editor

Volume 32, 1994

THE CANADIAN MINERALOGIST

JOURNAL OF THE MINERALOGICAL ASSOCIATION OF CANADA

Determination of the megastructures of the borate polymorphs pringleite and ruitenbergite	1
J.D. GRICE, P.C. BURNS & F.C. HAWTHORNE	
Refinement of the crystal structure of kulanite	15
M. COOPER & F.C. HAWTHORNE	
A-site disorder in synthetic fluor-edenite: a crystal-structure study	21
K.F. BOSCHMANN, P.C. BURNS, F.C. HAWTHORNE, M. RAUDSEPP & A.C. TURNOCK	
The crystal chemistry of manganese-bearing elbaite	31
P.C. BURNS, D.J. MACDONALD & F.C. HAWTHORNE	
Samfowlerite, a new Ca Mn Zn berylliosilicate mineral from Franklin, New Jersey: its characterization and crystal structure	43
R.C. ROUSE, D.R. PEACOR, P.J. DUNN, SHU-CHUN SU, P.H. CHI & H. YEATES	
Infrared spectroscopy and crystal chemistry of the beryl group	55
C. AURISICCHIO, O. GRUBESSI & P. ZECCHINI	
MAS and DOR NMR study of Al-Si order in the analcime–pollucite series	69
D.K. TEERTSTRA, B.L. SHERRIFF, ZHI XU & P. ČERNÝ	
The vibrational spectra and structure of nordenskiöldine	81
DIEN LI, MINGSHENG PENG & G.M. BANCROFT	
Energy calculations bearing on the dehydroxylation of muscovite	87
R.N. ABBOTT, JR.	
Antigorite with a large supercell from Saganoseki, Oita Prefecture, Japan	93
S. UEHARA & K. KAMATA	
An occurrence of sectored birefringence in almandine garnet	105
D. BROWN & R.A. MASON	
Helvite from the French Pyrénées as evidence for granite-related hydrothermal activity	111
A. RAGU	
Partitioning of zinc among common ferromagnesian minerals and implications for hydrothermal mobilization	121
C.A. JOHNSON	
Rare-earth mineralogy and geochemistry of the Mattagami Lake volcanogenic massive sulfide deposit, Quebec	133
YUANMING PAN, M.E. FLEET & R.L. BARNETT	
The behavior of rare-earth elements in high-temperature Cl-bearing aqueous fluids: results from the Ødegårdens Verk natural laboratory	149
D.J. LIEFTINK, T.G. NILAND & C. MAIJER	
Les minéraux sulfo-arsénés aurifères de Salsigne, Aude, France: évolution paragénétique d'une minéralisation tardi-hercynienne syntectonique en contexte sédimentaire	159
E. MARCOUX & J.-L. LESCUYER	
Kieftite, CoSb ₃ , a new member of the skutterudite group from Tunaberg, Sweden	179
R.T.M. DOBBE, W.J. LUSTENHOUWER, M.A. ZAKRZEWSKI, K. GOUBITZ, J. FRAANJE & H. SCHENK	
The Mn isotype of andorite and uchucchacuaite	185
HUIFANG LIU, L.L.Y. CHANG & C.R. KNOWLES	
¹⁹⁷ Au Mössbauer study of the gold–silver ditellurides sylvanite, krennerite and calaverite	189
F.E. WAGNER, J.A. SAWICKI, J. FRIEDL, J.A. MANDARINO, D.C. HARRIS & L.J. CABRI	
Phase relations in the system Ga-Fe-S at 900°C and 800°C	203
T. UENO & S.D. SCOTT	
Ferric iron and the binding of phosphorus, lead and carbon in river particulate matter	211
P.G. MANNING & XIAOWA WANG	
The crystal chemistry of spodumene in some granitic aplite–pegmatite bodies of northern Portugal: a comparative review: discussion	223
J.E.L. NUNES & C.L. GOMES	
The crystal chemistry of spodumene in some granitic aplite–pegmatite bodies of northern Portugal: a comparative review: reply	226
B. CHAROY, F. LHOTE, Y. DUSAUSOY & F. NORONHA	
BOOK REVIEWS	227

Complex exsolution in glaucophane from Tillotson Peak, north-central Vermont	E.A. SMELIK & D.R. VEBLEN	233
Structural variations in chrysotile asbestos fibers revealed by synchrotron X-ray diffraction and high-resolution transmission electron microscopy	B.A. CRESSEY, G. CRESSEY & R.J. CERNIK	257
Assemblages of platinum-group minerals and sulfides in silicate lithologies and chromite-rich rocks within the Shetland ophiolite	H.M. PRICHARD, R.A. IXER, R.A. LORD, J. MAYNARD & N. WILLIAMS	271
Mantle xenoliths from kimberlite near Kirkland Lake, Ontario	H.O.A. MEYER, M.A. WALDMAN & B.L. GARWOOD	295
Signs of incongruent melting of clinopyroxene in limburgite, Thetford Hill, Vermont	M.J. HIBBARD & J.J. SJOBERG	307
Vanadian-chromian garnet in mafic pyroclastic rocks of the Malé Karpaty Mountains, western Carpathians, Slovakia	P. ÚHER, M. CHOVAN & J. MAJZLAN	319
Geikielite from the Näätäniemi serpentinite massif, Kuhmo greenstone belt, Finland	J.P. LIPO, J.I. VUOLLO, V.M. NYKÄNNEN & T.A. PIIRAINEN	327
Ernienickelite, NiMn ₃ O ₇ ·3H ₂ O, a new mineral species from the Siberia complex, Western Australia: comments on the crystallography of the chalcophanite group	J.D. GRICE, B. GARTRELL, R.A. GAULT & J. VAN VELTHUIZEN	333
The crystal structure and crystal chemistry of fernandinite and corvusite	H.T. EVANS, JR., J.E. POST, D.R. ROSS & J.A. NELEN	339
Optical anisotropy of cuprite caused by polishing	E. LIBOWITZKY	353
Nuffieldite from the Maleevskoe massive sulfide deposit, Russia	N.N. MOZGOVA, S.N. NENASHEVA, Y.S. BORODAEV & M.A. YUDOVSKAYA	359
Revision of the crystal structure of mrázekite, Bi ₂ Cu ₃ (OH) ₂ O ₂ (PO ₄) ₂ ·2H ₂ O	H. EFFENBERGER, W. KRAUSE, K. BELENDORFF, H.-J. BERNHARDT, O. MEDENBACH, J. HYBLER & V. PETŘÍČEK	365
The crystal structure of wherryite, Pb ₇ Cu ₂ (SO ₄) ₄ (SiO ₄) ₂ (OH) ₂ , a mixed sulfate-silicate with [⁶ M(TO ₄) ₂] _n chains	M.A. COOPER & F.C. HAWTHORNE	373
The crystal structure of humberstonite, a mixed sulfate-nitrate mineral	P.C. BURNS & F.C. HAWTHORNE	381
Structure and hydrogen bonding in preobrazhenskite, a complex heteropolyhedral borate	P.C. BURNS & F.C. HAWTHORNE	387
Jahn-Teller distorted Mn ³⁺ O ₆ octahedra in fredrikssonite, the fourth polymorph of Mg ₂ Mn ³⁺ (BO ₃)O ₂	P.C. BURNS, M.A. COOPER & F.C. HAWTHORNE	397
Petersenite-(Ce), a new mineral from Mont Saint-Hilaire, and its structural relationship to other REE carbonates	J.D. GRICE, J. VAN VELTHUIZEN & R.A. GAULT	405
The structural chemistry of kalipyrochlore, a "hydropyrochlore"	T.S. ERCIT, F.C. HAWTHORNE & P. ČERNÝ	415
The geochemistry and crystal chemistry of columbite-group minerals from granitic pegmatites, southwestern Grenville Province, Canadian Shield	T.S. ERCIT	421
Høgtuvaite, a new beryllian member of the aenigmatite group from Norway, with new X-ray data on aenigmatite	R.I. GRAUCH, I. LINDAHL, H.T. EVANS, JR., D.M. BURT, J.J. FITZPATRICK, E.E. FOORD, P.-R. GRAFF & J. HYSINGJORD	439
Vector representation of some mineral compositions in the aenigmatite group, with special reference to høgtuvaite	D.M. BURT	449
Forms of iron and the bioavailability of phosphorus in eutrophic Amisk Lake, Alberta	P.G. MANNING, T.P. MURPHY & E.E. PREPAS	459
BOOK REVIEWS		469
Erratum		474
Referees for 1993		475

Structural aspects of oxidation – dehydrogenation in staurolite F. CAUCIA, A. CALLEGARI, R. OBERTI, L. UNGARETTI & F.C. HAWTHORNE	477
Crystal-structure refinement of hydrogen-rich staurolite F.C. HAWTHORNE, R. OBERTI, L. UNGARETTI, F. CAUCIA & A. CALLEGARI	491
Excess Y-group cations in the crystal structure of vesuvianite L.A. GROAT, F.C. HAWTHORNE & T.S. ERCIT	497
The incorporation of boron into the vesuvianite structure L.A. GROAT, F.C. HAWTHORNE & T.S. ERCIT	505
The crystal structure of wickenburgite, $Pb_3CaAl[AlSi_{10}O_{27}]_{(H_2O)_3}$, a sheet structure A.E. LAM, L.A. GROAT, M.A. COOPER & F.C. HAWTHORNE	525
Structure and hydrogen bonding in inderborite, a heteropolyhedral sheet structure P.C. BURNS & F.C. HAWTHORNE	533
Characterization of fine-grained mixtures of rock-forming minerals by Rietveld structure refinement: olivine + pyroxene JIAN-JIE LIANG & F.C. HAWTHORNE	541
The structure and physicochemical characteristics of a synthetic phase compositionally intermediate between liebigite and andersonite R. VOCHTEN, L. VAN HAVERBEKE, K. VAN SPRINGEL, N. BLATON & O.M. PEETERS	553
Refinement of the structure of gargarinite-(Y), $Na_x(Ca_xREE_{2-x})F_6$ J.M. HUGHES & J.W. DREXLER	563
A refinement of the structure of ferritungstite from Kalzas Mountain, Yukon, and observations on the tungsten pyrochlores T.S. ERCIT & G.W. ROBINSON	567
LREE-rich niobian titanite from Mount Bisson, British Columbia: chemistry and exchange mechanisms J.K. RUSSELL, L.A. GROAT & A.A.D. HALLERAN	575
The origin of aegirine in iron formation of the Cuyuna Range, east-central Minnesota P.L. MC SWIGGEN, G.B. MOREY & J.M. CLELAND	589
Epigenetic tourmaline in sedimentary red-beds: an example from the Silurian Rose Hill Formation, Virginia D.J. HENRY, GANG LU & C. McCABE	599
Chemical composition of tourmaline in quartz veins from Nea Roda and Thasos areas in Macedonia, northern Greece A. KASSOLI-FOURNARAKI & K. MICHAILEDIS	607
Primary scapolite in a granitic pegmatite, western Cherokee County, South Carolina S.K. MITTWEDE	617
Garnet-forming and garnet-eliminating reactions in a quartz diorite intrusion at Capo Vaticano, Calabria, Italy D.B. CLARKE & A. ROTTURA	623
Compositional evolution of metasomatic garnet in melilitic rocks of the Osečná complex, Bohemia J. ULRICH, P. POVONDRA, E. PIVEC, J. RUTŠEK & J. SITEK	637
Sedimentary-rock-hosted disseminated gold mineralization in the Alšar district, Macedonia T.J. PERCIVAL & A.S. RADTKE	649
Polymetallic Ag–Te-bearing paragenesis of the Cerro Negro District, Famatina Range, La Rioja, Argentina I.B. SCHALAMUK & M.A.V. LOGAN	667
Origin of albite pods in the Geordie Lake gabbro, Port Coldwell alkaline complex, northwestern Ontario: evidence for late-stage hydrothermal Cu–Pd mineralization D.J. GOOD & J.H. CROCKET	681
Platinum-group minerals in the Lac Sheen Cu–Ni–PGE prospect, Quebec N.J. COOK & S.A. WOOD	703
The crystal chemistry of staurolite: discussion L.S. HOLLISTER	713
The crystal chemistry of staurolite: reply F.C. HAWTHORNE, L. UNGARETTI, R. OBERTI, F. CAUCIA & A. CALLEGARI	714
BOOK REVIEWS 717	
New minerals recently approved by the Commission on New Minerals and Mineral Names	723

Chromite: from the fiery rain of chondrules to the Kilauea Iki lava lake	P.L. ROEDER	729
Two T-f(O ₂) paths in the Myoken-zan magnetite-bearing granitic complex, San'yo belt, southwestern Japan	T. TAKAGI & T. NUREKI	747
Cordierite-producing reactions in the Peña Negra Complex, Avila batholith, central Spain: the key role of cordierite in low-pressure anatexis	M.D. PEREIRA & F. BEA	763
Metamorphism of pelitic rocks in the Paleoproterozoic Ramah Group, Saglek area, northern Labrador: mineral reactions, P-T conditions and influence of bulk composition	F. MENGELE & T. RIVERS	781
Argentian-pentlandite-bearing assemblages in metamorphic rocks of the KTB pilot hole, Oberpfalz, Germany	A. KONTNY, G. FRIEDRICH, P. HERZIG & S. KEYSSNER	803
Occurrence and origin of djerfisherite from the Elwin Bay kimberlite, Somerset Island, Northwest Territories	D.B. CLARKE, R.H. MITCHELL, C.A.T. CHAPMAN & R.M. MACKAY	815
Scapolite in two Canadian gold deposits: Nickel Plate, British Columbia, and Hemlo, Ontario	YUANMING PAN, M.E. FLEET & G.E. RAY	825
McCrillisite, NaCs(Be,Li)Zr ₂ (PO ₄) ₄ ·1–2H ₂ O, a new mineral species from Mount Mica, Oxford County, Maine, and new data for gainesite	E.E. FOORD, M.E. BROWNFIELD, F.E. LICHTE, A.M. DAVIS & S.J. SUTLEY	839
Abenakiite-(Ce), a new silicophosphate carbonate mineral from Mont Saint-Hilaire, Quebec: description and structure determination	A.M. McDONALD, G.Y. CHAO & J.D. GRICE	843
Gaultite, a new zeolite-like mineral species from Mont Saint-Hilaire, Quebec, and its crystal structure	T.S. ERCIT & J. VAN VELTHUIZEN	855
The atomic arrangement of synchysite-(Ce), CeCaF(CO ₃) ₂	LIBEN WANG, YUNXIANG NI, J.M. HUGHES, P. BAYLISS & J.W. DREXLER	865
Characterization of the FeSO ₄ ·H ₂ O – CuSO ₄ ·H ₂ O solid-solution series, and the nature of poitevinitie, (Cu,Fe)SO ₄ ·H ₂ O	G. GIESTER, C.L. LENGAUER & G. REDHAMMER	873
Kaliborite: an example of a crystallographically symmetrical hydrogen bond	P.C. BURNS & F.C. HAWTHORNE	885
Hydrogen bonding in tunellite	P.C. BURNS & F.C. HAWTHORNE	895
The crystal structure of fusionite, Mn ²⁺ Sn ⁴⁺ (BO ₃) ₂ , a dolomite-structure borate	M. COOPER, F.C. HAWTHORNE, M. NOVÁK & M.C. TAYLOR	903
Electronic polarizability of oxygen and various cations in selected triclinic minerals: point-dipole theory	R.N. ABBOTT, JR.	909
Mineral recognition in digital images of rocks: a new approach using multichannel classification	P. LAUNEAU, A.R. CRUDEN & J.-L. BOUCHEZ	919
²³ Na, ²⁷ Al, ⁹ Be, ²⁹ Si solid state NMR study of tugtupite	ZHI XU & B.L. SHERRIFF	935
Heat capacity and entropy of bornite (Cu ₅ FeS ₄) between 6 and 760 K and the thermodynamic properties of phases in the system Cu-Fe-S	R.A. ROBIE, R.R. SEAL, II & B.S. HEMINGWAY	945
The mobility of the platinum-group elements in the soils of the Freetown Peninsula, Sierra Leone	J.F.W. BOWLES, A.P. GIZE & A. COWDEN	957
Procedures for the calculation of axial ratios on Pearce element-ratio diagrams	J. NICHOLLS & T.M. GORDON	969
BOOK REVIEWS		979
Proceedings of the thirty-ninth annual meeting of the Mineralogical Association of Canada	G.M. LECHEMINANT	985
The Hawley Medal for 1994 to F.C. Hawthorne, L. Ungaretti, R. Oberti, F. Caucia and A. Callegari		986
The Berry Medal for 1994 to Ann P. Sabina		988
The Past Presidents' Medal for 1994 to Roger H. Mitchell		990
Index, Volume 32	J.D. SCOTT	993