ALPHABETICAL INDEX

Names of authors are in capitals, subjects in lower case roman, and localities in *italics*; book reviews are placed at the end.

α-Al₂O₃, morphology modelled by computer, 607 Ab initio total energy calculations, of minerals using density functional theory and the local density approximation, 589

ABDEL-RAHMAN, A.-F.M., 129

Acid sulphate alteration, in a magmatic hydrothermal environment, Barton Peninsula, King George Island, Antarctica, 429

Active geothermal field, and tamarugite, NaAl(SO₄)₂·6H₂O, from *Te Kopia, New Zealand*, 754

Adachi, M., 489

Adinoles, revisited: hydrothermal Na(Ca)- metasomatism in the Dublin terrane, *Ireland*, 367

AGATA, T., 489

Agate, nanometre scale textures in, 103

AILLERES, L., 179

ALBINO, G.V., 383

Albite, in granitic aplites and pegmatites from *Portugal*, 35

Albitite, the chemical state of Fe in rutile from, 557 Aldan Shield, petrology and age determinations of the ultramafic (lamproitic) rocks from the Yakokut complex, 409

ALDERTON, D.H.M., 573

Alexandrite effect, and crystallographic orientation in synthetic alexandrite, 111

ALIETTI, E., 149

Alkali feldspar, micropores and micropermeable texture in, 505

Alkali feldspar, phenocrysts from the Shap granite, exsolution and alteration microtextures of, 63

Alpine orogeny, and *P-T-t* paths of Alpine greenschist-amphibolite facies metamorphic rocks from the western Tauern Window (*Eastern Alps*), 641

Al,Si order, in K-feldspars using ²⁷Al and ²⁹Si MAS Nuclear Magnetic Resonance, 47

Alteration, and exsolution microtextures in alkali feldspar phenocrysts from the Shap granite, *Cumbria, NW England*, 63

Amorphization, of hydrogen feldspar, 15

Amphibolites, from the western Tauern Window (Eastern Alps), and P-T deformation paths of the Alpine greenschist-amphibolite facies metamorphism, 641

Angus, N.S., 367

Anorthite, megacrysts from island arc basalts, 1;

high-temperature structural study of polymorphs of 25

ANTARCTICA, stable coexistence of grandidierite and kornerupine during medium-P granulite facies metamorphism in, 327; acid sulphate-type epithermal system on Barton Peninsula, King George Island, 429

Antimony, -rich titanite in the manganese concentrations at *St. Marcel-Praborna, Aosta Valley, Italy*: petrography and crystal chemistry, 717

Apatite, formation in layered intrusions: a comment, 757

Aplite, cordierite in felsic igneous rocks: a synthesis,

Argon systematics, in the study of microtextures in alkali feldspar phenocrysts from the Shap granite, *Cumbria, NW England*, 63

ARMSTRONG, D.C., 429

Arsenopalladinite, from the Cauê iron mine, *Itabira District, Minas Gerais, Brazil*, 455

ARSLAN, M., 750

ATHERTON, M.P., 203

AUDREN, C., 641

AUSTRALIA, boron-free and boron-poor varieties of kornerupine, 163; kintoreite, a new mineral from *Broken Hill*, 143

AUSTRIA, deposition and transport of gold in the Veitsch deposit, 253

Baddeleyite, new occurences, from two maficultramafic layered intrusions in *Russia*, 349

BEHRENS, H., 1

BERTRAND, J.M., 179

BEUKES, N.J., 703

Biotite, and garnet mode and distribution as an influence on Grt-Bt thermometry, 497; high in Ti from ignimbrites from the *Zilan Valley*, *Eastern Turkey*, 750

BIRCH, W.D., 143, 305

Birimian greenstone belt, genesis of chemical sediments from northern *Ghana*, 229

BIRKETT, T.C., 305

Bismuth, kusachiite, CuBi₂O₄, a new mineral from Fuka, Okayama Prefecture, Japan, 545

Borate, an unusual carbonate-borate mineral from *Russia*, 297; takedaite, Ca₃B₂O₆, a new mineral from *Fuka*, *Okayama Prefecture*, *Japan*, 549

Borcarite, hydrogen bonding in, 297

Boron-free and boron-poor, kornerupine from *Australia*, 163

Borosilicates, the stable coexistence of, during medium-P granulite facies metamorphism, 327

BÖTTCHER, M.E., 481

BOUDREAU, A., 757

BOWELL, R.J., 570

BRAZIL, palladium minerals from the Cauê iron mine, *Itabira District, Minas Gerais*, 455

BRIGATTI, M.F., 149

Browne, P.R.L., 754

Brucite, local density approximation and density functional theory in total energy studies of, 589

BRYON, D.N., 203

BURGER, A.M., 703

Burns, P.C., 297

CANADA: precipitation of vaterite during oilfield drilling in, 353

Carbonates, deriving interatomic potentials for, 617 Carbonatite, containing the lithium-mica taeniolite, 401; wöhlerite and niocalite from the alkaline rocks at *Kaiserstuhl, Germany*, 561

CARPENTER, G.J.C., 305

CARSON, C.J., 327

Cashion, J.D., 557

CASTEP, software package used in total energy calculations of minerals, 589

CESBRON, F.P., 553

CHAMPENOIS, M., 179

Chemical sediments, in Birimian greenstone belts: evidence from gondites and related manganese-bearing rocks from northern *Ghana*, 229

CHEN, Y., 273

CHERNYSHEVA, I.V., 79

CHINA, ultrahigh-P talc-bearing eclogite assemblages from, 93

Chlor-apatite, formation in layered intrusions, 757

Chlorites, in a spectrum of igneous rocks: mineral chemistry and paragenesis, 129

CHN elemental analysis, in the study of shannonite, a new mineral from *USA*, 305

Chondrite, mineralogy of a graphite-containing fragment in the Krymka chondrite, 443

Chrysoberyl, crystallographic orientation and the alexandrite effect, 111

CLARK, A.H., 273

CLARKE, D.B., 311

Clintonite, in skarns from Italy, 149

COENRAADS, R.R., 465

Colour, changes and crystallographic orientation in synthetic alexandrite, 111

Computer modelling, of mineral properties, 585; of the morphology of minerals, 607

Computer simulation, of classical and quantum molecular dynamics of minerals, 597

CONDLIFFE, E., 661

Confocal microscopy, generated images and the study of fission tracks, 197

COOPER, A.F., 401

COOPER, M.R., 213

Copper, kusachiite, CuBi₂O₄, a new mineral from Fuka, Okayama Prefecture, Japan, 545

Cordierite, in felsic igneous rocks: a synthesis, 311; local density approximation and density functional theory in total energy studies of, 589

Cornubian batholith, enclaves and their bearing on the origin of, 273

Corundum, morphology modelled by computer, 607 CRIDDLE, A.J., 305

Cristobalite, the effect of rigid unit modes in, 629

Crystal chemistry, and petrography of Sb-rich titanite, 717; and structure of high-Al phlogopite, 149; of wöhlerite and niocalite from the alkaline and carbonatite rocks at *Kaiserstuhl, Germany*, 561

Crystal structure, of borcarite, an unusual boratecarbonate mineral from *Russia*, 297; of penfieldite, 341; of vlodavetsite, 159

Crystallographic orientation, and the 'alexandrite effect' in synthetic alexandrite, 111

Cuspidine group, crystal chemistry of wöhlerite and niocalite from the alkaline and carbonatite rocks at *Kaiserstuhl, Germany*, 561

Daniel, P., 25

Dawe, J., 143

Decompression, and the stable coexistence, of grandidierite and kornerupine during medium-*P* granulite facies metamorphism, 327

Definition, of a mineral, 767

DELIENS, M., 143

DEMAIFFE, D., 661

Deposition, and transport of gold by thiosulphates in *Veitsch, Austria*, 253

Diaspore, local density approximation and density functional theory in total energy studies of, 589

DIRKS, P.H.G.M., 327

Disequilibrium melting, of high-thorium monazite-(Ce) under granulite-facies conditions, 735

Dove, M.T., 629

Eclogite, ultrahigh-P talc bearing assemblages, 93 Electron-microprobe analysis, of shannonite, a new mineral from USA, 305

ELTON, N.J., 166, 745

Enclaves, and their bearing on the origin of the Cornubian batholith, SW England, 273

ENGLAND, *Cornwall*, mahlmoodite, a second occurrence from, 166; *Cornwall*, widenmannite, the second world occurrence, from, 745; enclaves, and their bearing on the origin of the Cornubian batholith, 273; exsolution and alteration micro-

textures in alkali feldspar phenocrysts from the Shap granite, *Cumbria*, 63; *Isle of Man*, Gratonite from the, 573; precision serial lapping, imaging and 3-D reconstruction of minus-cement and post-cementation intergranular pore-systems in the Penrith Sandstone, 213

Enstatite, and the effect of fluorine and titanium on the vapour-absent melting of phlogopite and quartz, 566

Erratum, 570

Excess free energies, of mixing of Sr,Ba-bearing binary feldspar solid solutions, 79

Exsolution, and alteration microtextures in alkali feldspar phenocrysts from the Shap granite, *Cumbria, NW England*, 63

External detectors, fission track image analysis from, 197

Fabric, image analysis of, using semivariance, 189 Fault zone, sodium metasomatism associated with the Melones Fault Zone, *USA*, 383

Feldspar, micropores and micropermeable texture in, 505

Fenite, and the lithium-mica taeniolite in carbonatites, 401

Ferraris, G., 535

Ferrimagnetism, of hausmannite from hydrothermally altered manganese ore in the Palaeoproterozoic Kalahari manganese deposit, Transvaal Supergroup, South Africa, 703

Fibres, of nanometre scale in agate and opal, 103 FILATOV, S.K., 159

Filiform crystals, in a unique graphite-containing fragment of the Krymka chondrite, 443

Finite strain, the measurement of: implications for the Zone Houillère' (French Alps), 179

Fission tracks, image anlysis of, 197

FLINN, D., 259

Fluor-apatite, formation in layered intrusions, 757 Fluorine, and titanium, effect on the vapour-absent melting of phlogopite and quartz, 566

FORTEY, N.J., 177

FRANCE, image analysis in the measurement of finite strain by the normalized Fry method: geological implications for the Zone Houillère' (Briançonnais zone, *French Alps*), 179

FRIEDMAN, G.M., 353

FRIEND, C.R.L., 163

FRITSCH, E., 111

FUNDAMENSKY, V.S., 159

Fusion method, for preparing glass samples of peridotitic and picritic rock compositions for bulk analysis, 267

GANESHA, A.V., 566

GARCIA, S., 273

Garnet, and biotite mode and distribution as an

influence on Grt-Bt thermometry, 497; morimotoite a new titanian garnet from, *Japan*, 111

GARRATT, J.A., 189

GAUTHIER, M., 455

GAY, D.H., 607

Geochemistry, of ultramafic rocks of the Yakokut complex, Eastern Siberia, 409

Geothermobarometry, microstructures and mineral chemistry of greenschist-amphibolite facies metamorphism from the western Tauern Window (Eastern Alps), 641

GERMANY, wöhlerite and niocalite from the alkaline and carbonatite rocks at Kaiserstuhl, 561

GHANA, genesis of chemical sediments from, 229; gold-ligand complexing in tropical soils from, 570

GIANFAGNA, A., 341

GILLET, P., 25

GIRICH, A.L., 443

Glass samples, of peridotitic and picritic rock compositions, a fusion method for bulk analysis, 267

Gold, from Austria, deposition and transport by thiosulphates, 253

Gold-ligand complexing, in tropical soils from Ashanti, Ghana, 570

Gondite, chemical sediment genetic evidence from manganese-bearing rocks from northern *Ghana*, 229

Grain location, for microprobe analysis, 221

Grand Reef mine, shannonite, a new mineral from, 305

Grandidierite, and kornerupine, stable coexistence of, 327

Granite, cordierite in felsic igneous rocks: a synthesis, 311; enclaves and their bearing on the Cornubian, 273

Granitic textures, serial thin sectioning, image analysis and 3-D reconstruction of, 203

Granulite facies conditions, high-thorium monazite-(Ce) formed during disequilibrium melting of metapelites under, 735; the stable coexistence of grandidierite and kornerupine during, 327

Graphite, in a fragment of the Krymka chondrite (LL3), 443

Gratonite, from the Isle of Man, 573

Greenough, J.D., 497

GROVES, G.W., 103

Guidelines, for the reporting of stable hydrogen, carbon, and oxygen isotope-ratio data, 769

GUTZMER, J., 703

Gyrolite, and reyerite compared to tungusite, 535

Halotrichite, wupatkiite from the Cameron Uranium District, *Arizona*, *USA*, 553

HAMMONDS, K.D., 629

HAND, M., 327

Harzburgite, in Kundelungu kimberlites from Shaba, Zaire. 661

Hausmannite, from hydrothermally altered manganese ore in the Palaeoproterozoic Kalahari manganese deposit, Transvaal Supergroup, South Africa, 703

HAWTHORNE, F.C., 297

HAY, R.L., 47

HEINE, V, 629

HEMPHILL, S., 111

HENMI, K., 115

HENMI, C., 115, 545, 549

HERTOGEN, J., 661

High-aluminium phlogopite, crystal structure and chemistry of, 149

High-Ti biotite, bearing ignimbrites from the Zilan Valley, Eastern Turkey, 750

HOOPER, J.J., 166, 745

HUNTER, R.H., 203, 213

Hydrogen bond, reproduced for diaspore using density functional theory and the local density approximation, 589; bonding in borcarite, an unusual borate-carbonate mineral, 297

Hydrogen feldspar, infrared spectroscopy of, 15

Hydrothermal activity, in the genesis of chemical sediments from northern *Ghana*, 229

Hydrothermal alteration overprint, and tamarugite, NaAl(SO₄)₂·6H₂O, from *Te Kopia, New Zealand*, 754

Hydrothermal, Na(Ca)-metasomatism in the Dublin Terrane, *Ireland*, 367

Ignimbrites, high in Ti from the Zilan Valley, Eastern Turkey, 750

Ilvaite, from a serpentinized peridotite in the Asama igneous complex, Mikabu greenstone belt, Sambagawa metamorphic terrain, *Japan*, 489

Image analysis, in mineralogy and petrology, 177; in the measurement of finite strain by the normalized Fry method: geological implications for the Zone Houillère' (Briançonnais zone, French Alps), 179; in the study of fission tracks, 197; of petrographic textures and fabrics using semivariance, 189; precision serial lapping and 3-D reconstruction of minus-cement and post-cementation intergranular pore-systems in the Penrith Sandstone of NW England, 213; serial thin sectioning and 3-D reconstruction of granitic textures, 203

Incongruent melting, of phlogopite and quartz and the effect of fluorine and titanium, 566

Infrared spectroscopic, study of H feldspar, 15

Interatomic potentials, derivation for molecular ionic materials, 617

Ion exchange equilibria, in feldspar solid solutions, 79

Ionic materials, deriving empirical potentials for, 617

IRELAND, Na(Ca)-metasomatism in the Dublin Terrane, 367

Island arc, anorthite megecrysts in basalts from, 1 Isotope data, from ultramafic rocks of the Yakokut complex, Eastern *Siberia*, 409

Isotope-ratio data, new guidelines for the reporting of stable hydrogen, carbon and oxygen, 769

ITALY, high-Al phlogopite from skarns in, 149; Sbrich titanite, in the manganese concentrations at St. Marcel-Praborna, Aosta Valley, 717

JACKSON, R.A., 617

Jacutinga iron formation, containing palladium minerals, from *Brazil*, 455

JAPAN, anorthite megacrysts in basalts from the Japanese island arc, 1; kusachiite, CuBi₂O₄, a new mineral from Fuka, Okayama Prefecture, 545; ilvaite from a serpentinized peridotite in the Asama igneous complex, Mikabu greenstone belt, Sambagawa metamorphic terrain, 489; morimotoite a new titanian garnet from Okayama Prefecture, 111; takedaite, Ca₃B₂O₆, a new mineral from Fuka, Okayama Prefecture, 549

Jarosite-alunite family, kintoreite, a new mineral member, 143

JONES, G.C., 305

K-feldspar, Al, Si ordering in, 47; distribution of trace elements in feldspars of granitic aplites and pegamatites from *Portugal*, 35

KAMCHATKA, vlodavetsite, a new mineral from, 159

Камрата, M.D., 661

Kanaris-Sotiriou, R., 367

KARUP-MØLLER, S., 685

KELLER, J., 409, 561

KIM, Y.J., 47

KIMATA, M., 1

Kimberlites, megacrysts and ultramafic xenoliths from Zaire, 661

Kintoreite, a new mineral of the jarosite-alunite family, 143

Kirkpatrick, R.J., 47

KLEYENSTUBER, A.S.E., 703

Kobayashi, S., 549

Koberski, U., 561

Konova, V., 409

Kornerupine, and grandidierite, stable coexistence of, 327; boron-free and boron-poor varieties from *Australia*, 163

KOTELNIKOV, A.R., 79

K,Sr and K,Ba feldspar solid solutions, 79

KUCHA, H., 253

Kusachi, I., 115, 549

Kusachiite, CuBi₂O₄, a new mineral from Fuka, Okayama Prefecture, Japan, 545

Lamproitic rocks, of the Yakokut complex, Eastern Siberia, 409

Laurelite, and penfieldite: chemical and structural relationships between, 341

Layered intrusions, formation of chlor- and fluorapatite in, 757; in *Russia*: the source for new occurrences of baddeleyite, 349

Lead oxycarbonate, shannonite, a new mineral from USA, 305

Lead-iron phosphate, kintoreite, a new mineral from Australia. 143

LEAKE, B.E., 750

LEE, M.R., 63, 505

LENNIE, A.R., 677

Leucite, the effect of rigid unit modes in, 629

Lherzolite, in Kundelungu kimberlites from (*Shaba*, *Zaire*), 661

Liou, J.G., 93

Lithic clasts, and high-Ti biotite bearing ignimbrites from the Zilan Valley near Ercis, Lake Van, 750 Lithium, in carbonatites, 401

LIU, Y., 111

Local density approximation, and density functional theory in total energy studies of minerals, 589 Lusungite, discredited, 143

MACAUDIERE, J., 179

Mackinawite, synthesis and Rietveld structure refinement of, 677

Magma mixing, events and their bearing on the origin of the Cornubian batholith, SW England,

Magmatic origin, of cordierite in felsic igneous rocks: a synthesis, 311

Magnetic hausmannite, from hydrothermally altered manganese ore in the Palaeoproterozoic Kalahari manganese deposit, Transvaal Supergroup, *South Africa*, 703

Magnetite-saphire-zircon, xenolith from the Chanthaburi Gem Province, *Thailand*, 465

Mahlmoodite, a second occurrence, from *Cornwall*, *UK*, 166

MAKOVICKY, E., 685

Manganese concentrations, and Sb-rich titanite, 717
Manganese field, magnetic hausmannite from hydrothermally altered manganese ore in the
Palaeoproterozoic Kalahari manganese deposit,
703

Manganese phyllite, gondites and related manganesebearing rocks from northern *Ghana*, 229

Mangnesite, deposition and transport of gold from the Veitsch deposit, *Austria*, 253

Mantle metasomatism, and the lithium-mica taeniolite consequence of an enriched mantle source?, 401

Mantle minerals, computer simulation of classical and quantum molecular dynamics of, 597

MARVIN, computer code used in modelling the morphology of minerals, 607

MATSUI, T., 1

MATUSEVICH, G.L., 159

McKENZIE, K.M., 754

McMILLAN, F., 25

MEENAN, P.A., 617

Megacrysts, and ultramafic xenoliths from Kundelungu kimberlites, *Shaba, Zaire*, 661

Megacrysts, of anorthite from island arc basalts, 1

MELCHER, F., 229

Men'shikov, Y.P., 349

MERLINO, S., 341

Metamorphic origin, of cordierite in felsic igneous rocks: a synthesis, 311

Metapelites, high-thorium monazite-(Ce) formed during granulite-facies disequilibrium melting of, 735

Metasomatic origin, of cordierite in felsic igneous rocks: a synthesis, 311

Metasomatism, along the Melones fault zone, Sierra Nevada, California, USA, 383

Metastable nucleation, of anorthite polymorphs, 25 Micro furnace, used in the fusion of peridotitic and picritic rocks for bulk analysis, 267

Micropores, and micropermeable texture in alkali feldspars: geochemical and geophysical implications, 505

Microprobe analysis, a new procedure for the relocating mineral grains for, 221

Microstructures, and mineral chemistry in amphibolites from the western Tauern Window (*Eastern Alps*), and *P-T* deformation paths of the Alpine greenschist-amphibolite facies metamorphism, 641

Migmatite, cordierite in felsic igneous rocks: a synthesis, 311

Mikabu greenstone belt, ilvaite from a serpentinized peridotite from the Asama complex, 489

MILLER, J.A., 197

MILMAN, V., 589

Mineral chemistry, and microstructures in amphibolites from the western Tauern Window (*Eastern Alps*), and *P-T* deformation paths of the Alpine greenschist-amphibolite facies metamorphism, 641

Mineral, definition of, 767

Mineral grains, a new procedure for the relocation of, for microprobe analysis, 221

Mineral properties, advances in computer modelling of, 585

Minus-cement, and post-cementation intergranular pore-systems in the Penrith sandstone, *NW England*, image analysis of, 213

MITCHELL, D., 573

Mixing properties, of feldspar solid solutions, 79 Modelling, the morphology of minerals by computer, 607 Molecular dynamics, some recent developments in classical and quantum mechanical simulation of minerals, 597

Monazite-(Ce), (high-thorium) formed during disequilibrium melting of metapelites under granulitefacies conditions, 735

MOREAU, J., 661

Morimotoite, a new titanian garnet from Fuka, Okayama Prefecture, Japan, 111

Morphology, of minerals modelled by computer, 607 Mössbauer spectroscopy, in the study of Fe in rutile from an albitite in *Norway*, 557

MUES-SCHUMACHER, U., 409

MÜLLER, G., 15

MURAD, E., 557

MVUEMBA, N.F., 661

Na(Ca)-metasomatism, in the Dublin Terrane, Ireland. 367

Na-amphibole, in the formation of chlorite in a spectrum of igneous rocks, 129

NAMIBIA, lithium-micas in carbonatites from, 401 Nanometre scale, textures in agate and Beltane opal, 103

Neiva, A.M.R., 35

New manuscript guidelines, for the reporting of stable hydrogen, carbon, and oxygen isotope-ratio data, 769

New mineral, kusachiite, CuBi₂O₄, from Fuka, Okayama Prefecture, Japan, 545; Shannonite from USA, 305; takedaite from Fuka, Okayama Prefecture, Japan, 549; wupatkiite from the Cameron Uranium District, Arizona, USA, a new member of the halotrichite group, 553

New minerals, recently approved by the Commission on New Minerals and Mineral Names of the IMA, 355

New occurrences, of baddeleyite from 2 maficultramafic layered intrusions in *Russia*, 349

NEW ZEALAND, lithium-micas in carbonatites from, 401

NICKEL, E.H., 767

Niocalite, and wöhlerite from the alkaline and carbonatite rocks at *Kaiserstuhl, Germany*, 561

NISHIDA, N., 1

Noble, C., 557

Normalized Fry method, of measuring finite strain: implications for the Zone Houillère' (*French Alps*), 179

NORWAY, the chemical state of Fe in rutile from an albitite in, 557

Nuclear Magnetic Resonance, in the study of Al,Si ordering in K-feldspars, 47

ODLING, N.W.A., 267

Opal, nanometre scale textures in, 103

Orthoclase, exsolution and alteration microtextures of, 63

OWEN, J.V., 497

P-T-t-deformation paths, of the Alpine greenschistamphibolite facies metamorphism from the western Tauern Window (Eastern Alps), 641

PAKHOMOVSKII, Y.A., 349

Paleotemperature, estimation and the influence of garnet and biotite mode and distribution on Grt-Bt thermometry, 497

Palladium, metal formation and the Pd-Fe-Ni-S system at 900 and 725°C, 685

Palladium minerals, from the Cauê iron mine, *Itabira* District. Minas Gerais. Brazil, 455

Palladseite, from the Cauê iron mine, *Itabira District, Minas Gerais, Brazil,* 455

Paragenesis, and mineral chemistry of chlorites in a spectrum of igneous rocks, 129

Paragneiss, hosted garnet and biotite and the influence of mode and distribution on Grt-Bt thermometry, 497

PARSONS, I., 63, 505

PASERO, M., 341

PATEL, A., 597

PATERSON, L.A., 401

PAVESE, A., 535

PAYNE, M.C., 589

Pd-Fe-Ni-S system, at 900 and 725°C, 685

PEEM, Photo-emission electron microscopy heating investigations of a natural amphibole sample, 121

Pegmatite, cordierite in felsic igneous rocks: a synthesis, 311; distribution of trace elements in feldspars from *Portugal*, 35

Pelite, metasomatism of pelite screens adjacent to tholeitic dykes in *Ireland*, 367

Penfieldite, TEM and x-ray study of, 341

Penrith sandstone, precision serial lapping, imaging and 3-D reconstruction of minus-cement and postcementation intergranular pore-systems in the, 213

PENTECOST, A., 259

PERCHIAZZI, N., 341

Perchlorates, deriving interatomic potentials for, 617 Peridotite, fusion method for preparing glass samples of, 267

Perovskite, computer simulation of classical and quantum molecular dynamics of, 597

PERSEIL, E-A., 717

PERU, image analysis, serial thin sectioning and 3-D reconstruction of granitic textures from, 203

PETFORD, N., 197

Petrographic textures, image analysis of, using semivariance, 189

Petrography, and crystal chemistry of Sb-rich titanite, 717

Petrology, and age determinations of the ultramafic (lamproitic) rocks from the Yakokut complex, *Eastern Siberia*, 409

Phase equilibria, in ultrahigh-P talc-bearing eclogite assemblages, 93

Phase transitions, and the effect of rigid unit modes in framework silicates, 629

PHILLIPS, B.L., 47

Phlogopite, crystal structure and chemistry of a highaluminium variety, 149; the effect of fluorine and titanium on the vapour-absent melting of quartz and, 566

Phosphates, deriving interatomic potentials for, 617 Picrite, fusion method for preparing glass samples of, 267

PILBROW, J.R., 557

Pinite, cordierite in felsic igneous rocks: a synthesis, 311

Plagioclase, high-temperture structural study of, 25 Platinum-group elements, and the Pd-Fe-Ni-S system at 900 and 725\$C, 685

POPPI, L., 149

PORTUGAL, *Alijò-Sanfins*, distribution of trace elements in feldspars of granitic aplites and pegmatites from, 35

Potts, P.J., 221

PRASAD, A.V.K., 566

Precision serial lapping, imaging and 3-D reconstruction of minus-cement and post-cementation intergranular pore-systems in the Penrith Sandstone of *NW England*, 213

PRICE, G.D., 597, 617

PRING, A., 143

PROHASKA, W., 253

Quantum molecular dynamics, and classical molecular dynamics of minerals simulated by computer, 597

Quartz, morphology modelled by computer, 607; the effect of fluorine and titanium on the vapourabsent melting of phlogopite and, 566; the effect of rigid unit modes in, 629

Raman spectroscopy, observations on a new metastable anorthite polymorph, 25

REDFERN, S.A.T., 585, 677

Reducing conditions, and the formation of ilvaite during the serpentinization of peridotite from the Sambagawa metamorphic terrain, *Japan*, 489

REE, formed during disequilibrium melting of metapelites under granulite-facies conditions, 735 Reid, D.L., 401

Reyerite, and gyrolite compared to tungusite, 535 Rhodochrosite-smithsonite, (MnCO₃-ZnCO₃) solid-solutions formed at 5°C, 481

Rhyolite, cordierite in felsic igneous rocks: a synthesis, 311

RIBEIRO OLIVO, G., 455

RICHET, P., 25

Rietveld structure refinement, and synthesis of mackinawite, tetragonal FeS, 677

Rigid unit modes, in framework silicates, 629

ROBERTS, A.C., 305

ROBERTS, K.J., 617

Rodgers, K.A., 754

ROHL, A.L., 607

RUSSIA, hydrogen, bonding in borcarite, an unusual borate-carbonate mineral from, 297; new occurrences of baddeleyite from 2 mafic-ultramafic layered intrusions in, 349; petrology and age determinations of the ultramafic (lamproitic) rocks from the Yakokut Complex, Eastern Siberia, 409

Rutile, chemical state of Fe in, from an albitite in *Norway*, 557

SAITO, S., 1

Sambagawa metamorphism, of peridotite and the formation of ilvaite, in the Asama complex, Mikabu greenstone belt, *Japan*, 489

Sapphire-zircon-magnetite, xenolith from the Chanthaburi Gem Province, *Thailand*, 465

Sb-rich titanite, in the manganese concentrations at *St. Marcel-Praborna*, *Aosta Valley*, *Italy*: petrography and crystal chemistry, 717

Schofield, P.F., 677

SCHULTZ, D.J., 355

SCHULZ, B., 641

SEMENENKO, V.P., 443

Semivariance, use of in image analysis of petrographic textures and fabrics, 189

Serial thin sectioning, image analysis and 3-D reconstruction of granitic textures, 203

Serpentinization, of peridotite in the Asama igneous complex, Mikabu greenstone belt, *Japan*, 489; shannonite, a new mineral from the Grand Reef mine, *Graham County, Arizona, USA*, 305

SHIGLEY, J.E., 111

SHIMIZU, M., 1

Silicate minerals, fusion of, for bulk analysis, 267

Skarn, morimotoite a new titanian garnet in an endoskarn from, *Japan*, 111; high-Al phlogopite from skarns in *Italy*, 149

Smectite, interlayered with chlorite in a spectrum of igneous rocks, 129

SMITH. D.C. 717

Smithsonite, rhodochrosite-smithsonite (MnCO₃-ZnCO₃) solid-solutions formed at 5°C, 481

SOBOLEVA, S.V., 535

Sodium metasomatism, along the Melones fault zone, Sierra Nevada, California, USA, 383

Soils, gold-ligand complexing in tropical, 570

Solid-solution, rhodochrosite-smithsonite (MnCO₃-ZnCO₃) formed at 5°C, 481

Solid state transformations, in a natural amphibole sample, 121

SOUTH AFRICA, magnetic hausmannite, from hydrothermally altered manganese ore in the Palaeoproterozoic Kalahari manganese deposit, Transvaal Supergroup, 703

Stable coexistence, of grandidierite and kornerupine during medium-*P* granulite facies metamorphism, 327

Stable hydrogen, carbon, and oxygen isotope-ratio data reporting new guidelines, 769

STANFORD, D., 221

STAROVA, G.L., 159

STIMAC, J.A., 273

STIRLING, J.A.R., 305

Structural model, of tungusite, 535

Structure refinement, and crystal chemistry of high-Al phlogopite, 149

STUMPFL, E.F., 253

SUDDABY, P., 409

Sulphide melt, the Pd-Fe-Ni-S system at 900 and 725°C, and the role of the sulphide melt, 685 Sunagawa, I., 103

Supergene mineralization, and the second world occurrence of widenmannite from *Cornwall*, *England*, 745

SUTHERLAND, F.L., 465

Swan, A.R.H., 189

Synthesis, and Rietveld crystal structure refinement of mackinawite, tetragonal FeS, 677; of rhodochrosite-smithsonite (MnCO₃-ZnCO₃) solid-solutions formed at 5°C, 481

Taeniolite, in carbonatites, 401

Taijing, Lu, 103

Takedaite, a new mineral from Fuka, Okayama Prefecture, Japan, 549

Talc, ultrahigh-P talc-bearing eclogite assemblages, 93

Tamarugite, NaAl(SO₄)₂.6H₂O, from *Te Kopia, New Zealand*, 754

TAREEN, J.A.K., 566

TAYLOR, M., 143

Telfer, G.B., 617

TEM, and x-ray study of penfieldite: average structure and multiple cells, 341; in observations of nanometre scale textures in agate and opal, 103; in the study of shannonite, a new mineral from *USA*, 305

Ternary isotherm plot, for high-Ti biotite bearing ignimbrites from the Zilan Valley, Eastern Turkey, 750

Tetrahedrite, deposition and transport of gold in, from Austria, 253

Texture, image analysis, serial thin sectioning and 3-D reconstruction of granitic, 203; on the nanometre scale in agate and Beltane opal, 103

THAILAND, an unusual sapphire-zircon-magnetite xenolith from the Chanthaburi Gem Province, 465

Thermometry, garnet and biotite mode and distribution as an influence on Grt-Bt thermometry, 497

Thiosulphate, in the deposition and transport of gold in *Austria*, 253

Thorium, (-high) monazite-(Ce) formed during disequilibrium melting of metapelites under granulite-facies conditions, 735

TINDLE, A.G., 221

Titanite, in the manganese concentrations at St. Marcel-Praborna, Aosta Valley, Italy: petrography and crystal chemistry, 717

Titanium, and fluorine, effect on the vapour-absent melting of phlogopite and quartz, 566; morimotoite a new titanian garnet from, *Japan*, 111

Total energy calculations, of minerals using density functional theory and the local density approximation, 589

Trace elements, in feldspars of granitic aplites and pegmatites from *Portugal*, 35

TRIBOULET, C., 641

Tungusite, new data, relationship with gyrolite and structural model, 535

TURKEY, high-Ti biotite bearing ignimbrites from the *Zilan Valley*, 750

Ultrahigh-P talc-bearing eclogite assemblages, 93 Ultramafic rocks, of the Yakokut complex, Eastern

Siberia, 409
Ultramafic xenoliths, and megacrysts from

Kundelungu kimberlites (*Shaba, Zaire*), 661 Uranium mineralization, and the second world occurrence of widenmannite from *Cornwall*, *England*, 745

Uranium-lead dating, of zircon in an unusual sapphire-zircon-magnetite xenolith from the Chanthaburi Gem Province, *Thailand*, 465

USA, Arizona, wupatkiite from the Cameron Uranium District, 553; shannonite, new mineral, 305; California nanometre scale textures in the Beltane opal, 103; sodium metasomatism along the Melones Fault Zone, Sierra Nevada, 383

Vacuum-heating, investigations of a natural amphibole sample, 121

Vaterite, precipitation of, during oilfield drilling in *Quebec, Canada*, 353

VAUGHAN, D.J., 677

VICHIT, P., 465

Vlodavetsite, crystal structure of, 159

VOCADLO,L., 597

Volcanic-hosted argillic alteration, on Barton Peninsula, King George Island, Antarctica, 429

WALDRON, K.A., 63 WALENTA, K., 143 WALKER, F.D.L., 505

WARTHO, J.-A., 121

WATT, G.R., 735

Western Tauern Window, *P-T-t* paths of Alpine greenschist-amphibolite facies metamorphic rocks from the, 641

Widenmannite, from *Cornwall*, *England*, the second world occurrence, 745

WILDE, P.J., 617

WILLIAMS, C.T., 561

WILLIAMS, S.A., 533

Winkler, B. 589

Wöhlerite and niocalite from the alkaline and carbonatite rocks at Kaiserstuhl, Germany, 561

Wupatkiite, from the Cameron Uranium District, *Arizona*, *USA*, a new member of the halotrichite group, 553

X-ray, and TEM study of penfieldite: average structure and multiple cells, 341

X-ray powder-diffraction, pattern of shannonite, a new mineral from *USA*, 305

Xenocrysts, of cordierite in felsic igneous rocks: a synthesis, 311

Xenolith, containing saphire, zircon and magnetite from the Chanthaburi Gem Province, *Thailand*, 465

XIAO, Y., 47

YU BARKOV, A., 349

ZAIRE, Megacrysts and ultramafic xenoliths from Kundelungu kimberlites, 661

ZARAKAWA, Y., 1

ZHANG, R.Y., 93

ZHANG, X., 103

Zinc, hydroxycarbonate, and rhodochrosite-smithsonite (MnCO₃-ZnCO₃), solid-solutions formed at 5°C, 481

Zircon, morphology modelled by computer, 607 Zircon-sapphire-magnetite, xenolith from the Chanthaburi Gem Province, *Thailand*, 465

Zirconium content, in mafic-ultramafic layered intrusions from *Russia* and its relationship to occurrences of baddeleyite, 349