

# **Mineralogical Magazine**

PRINCIPAL EDITOR: M. D. WELCH

Volume 74

(Nos. 482–487, 2010)

THE MINERALOGICAL SOCIETY

12 BAYLIS MEWS, AMYAND PARK ROAD,  
TWICKENHAM TW1 3HQ,

2010



# CONTENTS

[No. 482, FEBRUARY 2010]

## *Review*

- M. R. LEE: Transmission electron microscopy (TEM) of Earth and planetary materials: A review 1

## *Letter*

- G. CRESSEY, B. A. CRESSEY, F. J. WICKS and K. YADA: A disc with fivefold symmetry: the proposed fundamental seed structure for the formation of chrysotile asbestos fibres, polygonal serpentine fibres and polyhedral lizardite spheres 29

## *Research Articles*

- P. ELLIOTT, J. BRUGGER and T. CARADOC-DAVIES: Description and crystal structure of a new mineral, edwardsite,  $\text{Cu}_3\text{Cd}_2(\text{SO}_4)_2(\text{OH})_6 \cdot 4\text{H}_2\text{O}$ , from Broken Hill, New South Wales, Australia 39
- M. NAGASHIMA and T. ARMBRUSTER: Ardennite, tiragalloite and medaite: structural control of  $(\text{As}^{5+}, \text{V}^{5+}, \text{Si}^{4+})\text{O}_4$  tetrahedra in silicates 55
- U. KOLITSCH: The crystal structure and compositional range of mckinstryite 73
- A. M. T. BELL, R. A. D. PATTRICK and D. J. VAUGHAN: Structural evolution of aqueous mercury sulphide precipitates: energy-dispersive X-ray diffraction studies 85
- J. PLÁŠIL, J. ČEJKA, J. SEJKORA, P. ŠKÁCHA, V. GOLIÁŠ, P. JARKA, F. LAUFER, J. JEHLIČKA, I. NĚMEC and L. STRNAD: Widenmannite, a rare uranyl lead carbonate: occurrence, formation and characterization 97
- S. W. FARYAD, H. KLÁPOVÁ AND L. NOSÁL: Mechanism of formation of atoll garnet during high-pressure metamorphism 111
- W. A. CRICHTON, H. MÜLLER, M. MERLINI, T. ROTH and C. DETLEFS: Monazite structure from dehydrated  $\text{CaSeO}_4 \cdot 2\text{H}_2\text{O}$  127
- F. DEMARTIN, C. M. GRAMACCIOLI and I. CAMPOSTRINI: Demicheleite-(I), BiSI, a new mineral from La Fossa Crater, Vulcano, Aeolian Islands, Italy 141
- A. GARAVELLI, T. BALIĆ-ŽUNIĆ, D. MITOLO, P. ACQUAFREDDA, E. LEONARDSEN and S. P. JAKOBSSON: Heklaite,  $\text{KNaSiF}_6$ , a new fumarolic mineral from Hekla volcano, Iceland 147
- I. ROZHDESTVENSKAYA, E. MUGNAIOLI, M. CZANK, W. DEPMEIER, U. KOLB, A. REINHOLDT and T. WEIRICH: The structure of charoite,  $(\text{K}, \text{Sr}, \text{Ba}, \text{Mn})_{15-16}(\text{Ca}, \text{Na})_{32}[(\text{Si}_{70}(\text{O}, \text{OH})_{180})](\text{OH}, \text{F})_{4.0} \cdot n\text{H}_2\text{O}$ , solved by conventional and automated electron diffraction 159

## *CNMNC Newsletter 1*

- S.J. MILLS: The early publication of new mineral names: new procedures for the release of new mineral names and publication 179

## Book reviews

## Erratum

[No. 483, APRIL 2010]

## *Review*

- B. HARTE: Diamond formation in the deep mantle: the record of mineral inclusions and their distribution in relation to mantle dehydration zones 189

## *Letter*

- E. KRENN and F. FINGER: Unusually Y-rich monazite-(Ce) with 6–14 wt.%  $\text{Y}_2\text{O}_3$  in a granulite from the Bohemian Massif: implications for high temperature monazite growth from the monazite-xenotime miscibility gap thermometry 217

## CONTENTS

### *Research Articles*

A. V. KUZYURA, F. WALL, T. JEFFRIES and YU. A. LITVIN: Partitioning of trace elements between garnet, clinopyroxene and diamond-forming carbonate-silicate melt at 7 GPa	227
B. M. SHABAGA, M. FAYEK and F. C. HAWTHORNE: Boron and lithium isotopic compositions as provenance indicators of Cu-bearing tourmalines	241
P. C. PILONEN, A. M. McDONALD, J. D. GRICE, M. A. COOPER, U. KOLITSCH, R. ROWE, R. A. GAULT and G. POIRIER: Arisite-(La), a new REE-fluorcarbonate mineral from the Aris phonolite (Namibia), with descriptions of the crystal structures of arisite-(La) and arisite-(Ce)	257
G. O. LEPORE and M. D. WELCH: The crystal structure of parkinsonite, nominally $\text{Pb}_7\text{MoO}_9\text{Cl}_2$ : a naturally occurring Aurivillius phase	269
M. MELLINI, G. CRESSEY, F. J. WICKS and B. A. CRESSEY: The crystal structure of Mg end-member lizardite-1T forming polyhedral spheres from the Lizard, Cornwall	277
E. SOKOLOVA, F. C. HAWTHORNE, L. A. PAUTOV and A. A. AGAKHANOV: Byzantievite, $\text{Ba}_5(\text{Ca},\text{REE},\text{Y})_{22}(\text{Ti},\text{Nb})_{18}(\text{SiO}_4)_4[(\text{PO}_4)_4(\text{SiO}_4)]_4(\text{BO}_3)_9\text{O}_{21}[(\text{OH}),\text{F}]_{43}(\text{H}_2\text{O})_{1.5}$ : the crystal structure and crystal chemistry of the only known mineral with the oxyanions ( $\text{BO}_3$ ), ( $\text{SiO}_4$ ) and ( $\text{PO}_4$ )	285
S. STAUDE, T. MORDHORST, R. NEUMANN, W. PREBECK and G. MARKL: Compositional variation of the tennantite–tetrahedrite solid-solution series in the Schwarzwald ore district (SW Germany): the role of mineralization processes and fluid source	309
E. K. H. SALJE, J. KOPPENSTEINER, W. SCHRANZ and E. FRITSCH: Elastic instabilities in dry, mesoporous minerals and their relevance to geological applications	341
R. MACDONALD, N. W. ROGERS, B. BAGIŃSKI and P. DZIERŻANOWSKI: Distribution of gallium between phenocrysts and melt in peralkaline salic volcanic rocks, Kenya Rift Valley	351
I. O. GALUSKINA, E. V. GALUSKIN, B. LAZIC, T. ARMBRUSTER, P. DZIERŻANOWSKI, K. PRUSIK and R. WRZALIK: Eringaite, $\text{Ca}_3\text{Sc}_2(\text{SiO}_4)_3$ , a new mineral of the garnet group	365

### *CNMNC Newsletter 2*

P. A. WILLIAMS, F. HATERT, M. PASERO and S. MILLS: New minerals and nomenclature modifications approved in 2010	375
---	-----

### Book review

379

[No. 484, JUNE 2010]

### *Review*

A. M. WALKER, P. CARREZ and P. CORDIER: Atomic-scale models of dislocation cores in minerals: progress and prospects	381
--	-----

### *Research Articles*

S. B. BLANCHER, P. D'ARCO, M. FONTEILLES and M.-L. PASCAL: Evolution of nepheline from mafic to highly differentiated members of the alkaline series: the Messum complex, Namibia	415
C. H. YODER, E. BUSHONG, X. LIU, V. WEIDNER, P. MCWILLIAMS, K. MARTIN, J. LORGUNPAI, J. HALLER and R. W. SCHAEFFER: The synthesis and solubility of the copper hydroxyl nitrates: gerhardtite, rouaite and likasite	433
Y. A. UVAROVA, E. SOKOLOVA, F. C. HAWTHORNE, R. P. LIFEROVICH, R. H. MITCHELL, I. V. PEKOV and A. E. ZADOV: Noonkanbahite, $\text{BaKNaTi}_2(\text{Si}_4\text{O}_{12})\text{O}_2$ , a new mineral species: description and crystal structure	441
TAO CHEN, HEJING WANG, ROGER MASON and LI CHEN: HRTEM investigation of intralayer and interlayer stacking defects and pyrophyllite interlayers in illite	451
V. A. KOVALENKER, O. YU. PLOTINSKAYA, C. J. STANLEY, A. C. ROBERTS, A. M. McDONALD and M. A. COOPER: Kurilite – $\text{Ag}_8\text{Te}_3\text{Se}$ – a new mineral from the Prasolovskoe deposit, Kuril Islands, Russian Federation	463
U. KOLITSCH, D. ATENCIO, N. V. CHUKANOV, N. V. ZUBKOVA, L. A. D. MENEZES FILHO, J. M. V. COUTINHO, W. D. BIRCH, J. SCHLÜTER, D. POHL, A. R. KAMPF, I. M. STEELE, G. FAVREAU,	

## CONTENTS

L. NASDALA, S. MÖCKEL, G. GIESTER and D. YU. PUSHCHAROVSKY: Bendadaite, a new iron arsenate mineral of the arthurite group	469
S. J. MILLS, S. L. HAGER, P. LEVERETT, P. A. WILLIAMS and M. RAUDSEPP: The structure of $\text{H}_3\text{O}^+$ -exchanged pharmacosiderite	487
S. M. REDDY, C. CLARK, N. E. TIMMS, and B. M. EGLINGTON: Electron backscatter diffraction analysis and orientation mapping of monazite	493
R. L. JONES, M. THRALL, and C. M. B. HENDERSON: Complex impedance spectroscopy and ionic transport properties of natural leucite, $\text{K}_{0.90}\text{Na}_{0.08}[\text{Al}_{0.98}\text{Si}_{2.02}]\text{O}_6$ , as a function of temperature and pressure	507
F. CÁMARA, F. C. HAWTHORNE, N. A. BALL, G. BEKENOV, A. V. STEPANOV, and P. E. KOTEL'NIKOV: Fluoroleakeite, $\text{NaNa}_2(\text{Mg}_2\text{Fe}_2^{3+}\text{Li})\text{Si}_8\text{O}_{22}\text{F}_2$ , a new mineral of the amphibole group from the Verkhnee Espe deposit, Akjailyautas Mountains, Eastern Kazakhstan District, Kazakhstan: description and crystal structure	521
I. PARSONS: Feldspars defined and described: a pair of posters published by the Mineralogical Society. Sources and supporting information	529
M. ZEMA, S. C. TARANTINO and A. M. CALLEGARI: Thermal behaviour of libethenite from room temperature up to dehydration	553
F. C. HAWTHORNE and W. B. SIMMONS: The crystal structure of zigrasite, $\text{MgZr}(\text{PO}_4)_2(\text{H}_2\text{O})_4$ , a heteropolyhedral framework structure	567
<i>CNMNC Newsletter 3</i>	
P. A. WILLIAMS, F. HATERT, M. PASERO and S. MILLS: New minerals and nomenclature modifications approved in 2010	577
Erratum	580

### [No. 485, AUGUST 2010]

M. VÍTKOVÁ, V. ETTLER, Z. JOHAN, B. KRÍBEK, O. ŠEBEK and M. MIHALJEVIĆ: Primary and secondary phases in copper-cobalt smelting slags from the Copperbelt Province, Zambia	581
R. MACDONALD, B. BAGIŃSKI, B. G. J. UPTON, H. PINKERTON, D. A. MACINNES and J. C. MACGILLIVRAY: The Mull Palaeogene dyke swarm: insights into the evolution of the Mull igneous centre and dyke-emplacement mechanisms	601
A. R. KAMPF, F. COLOMBO and J. GONZÁLEZ DEL TÁNAGO: Carlhintzeite, $\text{Ca}_2\text{AlF}_7\cdot\text{H}_2\text{O}$ , from the Gigante granitic pegmatite, Córdoba province, Argentina: description and crystal structure	623
A. JANSEN, A. PUTNIS, T. GEISLER and C. V. PUTNIS: The experimental replacement of ilmenite by rutile in HCl solutions	633
F. C. J. VILALVA and S. R. F. VLACH: Major- and trace-element composition of REE-rich turkestanite from peralkaline granites of the Morro Redondo Complex, Graciosa Province, south Brazil	645
B. BUDZYŃ, C. J. HETHERINGTON, M. L. WILLIAMS, M. J. JERCINOVIC and M. MICHALIK: Fluid–mineral interactions and constraints on monazite alteration during metamorphism	659
A. R. KAMPF and S. J. MILLS: Lead hydrogen citrate monohydrate, $\text{Pb}(\text{C}_6\text{H}_6\text{O}_7)\cdot\text{H}_2\text{O}$ , formation during specimen cleaning: a cautionary mineralogical tale	683
T. GRAUPNER, F. MELCHER, H.-E. GÄBLER, M. SITNIKOVA, H. BRÄTZ and A. BAHR: Rare earth element geochemistry of columbite-group minerals: LA-ICP-MS data	691
T. S. ERCIT: Hidden story of taquiolite	715
J. PARAFINIUK and Ł. KRUSZEWSKI: Minerals of the ammonioalunite–ammoniojarosite series formed on a burning coal dump at Czerwionka, Upper Silesian Coal Basin, Poland	731
C. RATHOSSI, P. TSOLIS-KATAGAS and C. KATAGAS: Thermal behaviour of ‘metamorphic vermiculite’ in Ca-rich ancient ceramic sherd and experimental ceramics	747
M. D. RUIZ CRUZ: Zoned Ca-amphibole as a new marker of the Alpine metamorphic evolution of phyllites from the Jubrique unit, Alpujárride Complex, Betic Cordillera, Spain	773

## CONTENTS

### *CNMNC Newsletter 4*

- P. A. WILLIAMS, F. HATERT, M. PASERO and S. J. MILLS: New minerals and nomenclature modifications approved in 2010

797

### Book Reviews

801

## [No. 486, OCTOBER 2010]

- A. N. ZAITSEV, C. T. WILLIAMS, S. N. BRITVIN, I. V. KUZNETSOVA, J. SPRATT, S. V. PETROV and J. KELLER: Kerimasite,  $\text{Ca}_2\text{Zr}_2(\text{Fe}^{3+}\text{Si})\text{O}_{12}$ , a new garnet from carbonatites of Kerimasi volcano and surrounding explosion craters, northern Tanzania
- S. V. KRIVOVICHEV, V. N. YAKOVENCHUK, E. S. ZHITOVA, A. A. ZOLOTAREV, Y. A. PAKHOMOVSKY and G. YU. IVANYUK: Crystal chemistry of natural layered double hydroxides. 1. Quintinite- $2H$ - $3c$  from the Kovdor alkaline massif, Kola peninsula, Russia
- S. V. KRIVOVICHEV, V. N. YAKOVENCHUK, E. S. ZHITOVA, A. A. ZOLOTAREV, Y. A. PAKHOMOVSKY and G. YU. IVANYUK: Crystal chemistry of natural layered double hydroxides. 2. Quintinite- $1M$ : first evidence of a monoclinic polytype in  $M^{2+}$ - $M^{3+}$  layered double hydroxides
- E. S. ZHITOVA, V. N. YAKOVENCHUK, S. V. KRIVOVICHEV, A. A. ZOLOTAREV, Y. A. PAKHOMOVSKY and G. YU. IVANYUK: Crystal chemistry of natural layered double hydroxides. 3. The crystal structure of Mg,Al-disordered quintinite- $2H$
- LIDONG DAI, HEPING LI, CHUNHAI LI, HAIYING HU and SHUANGMING SHAN: The electrical conductivity of dry polycrystalline olivine compacts at high temperatures and pressures

803

821

833

841

849

### *CNMNC Newsletter 5*

- P. A. WILLIAMS, F. HATERT, M. PASERO and S. J. MILLS: New minerals and nomenclature modifications approved in 2010

859

- S. J. MILLS, A. R. KAMPF, P. A. WILLIAMS, P. LEVERETT, G. POIRIER, M. RAUDSEPP and C. A. FRANCIS: Hydroniumpharmacosiderite, a new member of the pharmacosiderite supergroup from Cornwall, UK: structure and description

863

- M. NAGASHIMA, T. ARMBRUSTER and T. HAINSCHWANG: A temperature-dependent structure study of gem-quality hibonite from Myanmar

871

- L. MELLUSO, S. CONTICELLI and R. DE' GENNARO: Kirschsteinite in the Capo di Bove melilite leucite lava (cecilite), Alban Hills, Italy

887

- S. J. MILLS, S. A. WILSON, G. M. DIPPLE and M. RAUDSEPP: The decomposition of konyaite: importance in  $\text{CO}_2$  fixation in mine tailings

903

- P. BAYLISS, U. KOLITSCH, E. H. NICKEL and A. PRING: Alunite supergroup: recommended nomenclature

919

- M. S. RUMSEY, S. J. MILLS and J. SPRATT: Natropharmacoalumite,  $\text{NaAl}_4[(\text{OH})_4(\text{AsO}_4)_3] \cdot 4\text{H}_2\text{O}$ , a new mineral of the pharmacosiderite supergroup and the renaming of aluminopharmaco-siderite to pharmacoalumite

929

### Erratum

937

### Obituary

939

## [No. 487, DECEMBER 2010]

### *CNMNC Newsletter 6*

- P. A. WILLIAMS, F. HATERT, M. PASERO and S. J. MILLS: New minerals and nomenclature modifications approved in 2010

941

- L. M. SOCHALSKI-KOLBUS, R. J. ANGEL and F. NESTOLA: The effect of Al/Si disorder on the bulk moduli of plagioclase feldspars

943

## CONTENTS

R. OBERTI, M. BOIOCCHI, F. C. HAWTHORNE and P. ROBINSON: Crystal structure and crystal chemistry of fluoro-potassic-magnesio-arfvedsonite from Monte Metocha, Xixano region, Mozambique, and discussion of the holotype from Quebec, Canada	951
R. OBERTI, M. BOIOCCHI, F. C. HAWTHORNE, R. PAGANO and A. PAGANO: Fluoro-potassic-pargasite, $KCa_2(Mg_4Al)(Si_6Al_2)O_{22}F_2$ from the Tranomaro area, Madagascar: mineral description and crystal chemistry	961
I. E. GREY, W. G. MUMME, S. M. NEVILLE, N. C. WILSON and W. D. BIRCH: Jahnsite–whiteite solid solutions and associated minerals in the phosphate pegmatite at Hagendorf-Süd, Bavaria, Germany	969
M. WIERZBICKA-WIECZOREK, U. KOLITSCH, L. NASDALA and E. TILLMANNS: $K_{2.9}Rb_{0.1}ErSi_3O_9$ : a novel, non-centrosymmetric chain silicate and its crystal structure	979
A. R. KAMPF, S. J. MILLS and R. M. HOUSLEY: The crystal structure of munakataite, $Pb_2Cu_2(Se^{4+}O_3)(SO_4)(OH)_4$ , from Otto Mountain, San Bernardino County, California, USA	991
L. BINDI, F. NESTOLA, A. GUASTONI and L. SECCO: The crystal structure of dalnegroite, $Tl_{5-x}Pb_{2x}(As,Sb)_{21-x}S_{34}$ : a masterpiece of structural complexity	999
V. BERMANEC, N. TOMAŠIĆ, Ž. ŽIGOVEČKI GOBAC, M. RAJĆ LINARIĆ and K. FURIĆ: Dehydration processes in borate minerals: pentahydroborite and nifontovite from Fuka Mine, Okayama prefecture, Japan	1013
A. C. KERR, M. KHAN and I. McDONALD: Eruption of basaltic magma at Tor Zawar, Balochistan, Pakistan on 27 January 2010: geochemical and petrological constraints on petrogenesis	1027
F. BOSI: Octahedrally coordinated vacancies in tourmaline: a theoretical approach	1037
 Book review	1045
Corrigendum	1047
Alphabetical Index	1049
Book Reviews Index	1056
Referees	1057