

JUNE 2019 - VOL. 83 (3), NO. 546

MINERALOGICAL MAGAZINE



JOURNAL OF THE MINERALOGICAL SOCIETY



MINERALOGICAL SOCIETY

CAMBRIDGE
UNIVERSITY PRESS

MINERALOGICAL MAGAZINE

ISSN 0026-461X

Principal Editors

S. J. MILLS, *Museums Victoria, Melbourne, Australia*
R. H. MITCHELL, *Department of Geology, Lakehead University, Thunder Bay,
Ontario P7B 5E1, Canada*

(Manuscripts should be submitted on-line at <http://www.editorialmanager.com/minmag/>)

Associate Editors

M. ARIMA, *Yokohama National University, Japan*
D. ATENCIO, *University of Sao Paulo, Brazil*
F. BOSI, *University of Rome, Italy*
S. BROOM-FENDLEY, *Camborne School of Mines, UK*
L. CAMPBELL, *University of Manchester, UK*
A. CHAKRABARTY, *Indian Institute of Science Education and
Research Tirupati, India*
A. G. CHRISTY, *Australian National University, Canberra,
Australia*
C. L. CORKHILL, *University of Sheffield, UK*
I. COULSON, *University of Regina, Canada*
G. DELLA VENTURA, *Università Roma Tre, Roma, Italy*
I. GALUSKINA, *University of Silesia, Poland*
G. D. GATTA, *Università degli Studi di Milano, Italy*
C. A. GEIGER, *University of Salzburg, Austria*
I. GRAHAM, *University of New South Wales, Australia*
E. S. GREW, *University of Maine, USA*
J. HARVEY, *University of Leeds, UK*
D. HIBBS, *University of Sydney, Australia*
A. R. KAMPF, *Natural History Museum of Los Angeles
County, USA*
S. KRIVOVICHEV, *St Petersburg State University, Russia*
F. LAUFEK, *Czech Geological Survey, Czech Republic*
M. LEE, *Glasgow University, UK*
J. MAJZLAN, *University of Jena, Germany*
L. MELLUSO, *Università di Napoli Federico II, Italy*
K. MOMMA, *National Museum of Nature and Science,
Tokyo, Japan*
T. MUELLER, *University of Leeds, UK*
B. O'DRISCOLL, *University of Manchester, UK*
K. PFAFF, *Colorado School of Mines, Golden, USA*
M. J. RUMSEY, *Natural History Museum, London, UK*
O. SIIDRA, *St Petersburg State University, Russia*
C. D. STOREY, *University of Portsmouth, UK*

Reviews Editor: H. DOWNES

Structures Editor: P. LEVERETT

Production Editor: H. C. KERBEY

MINERALOGICAL SOCIETY

[Registered Charity No. 233706]

Officers and Council for 2019

President: B. W. D. Yardley

Treasurer: J. Harvey *P.R.O.:* P. Pogge von Strandmann *General Secretary:* J. M. Horák

Principal Editors of the Magazine: S. J. Mills, R. H. Mitchell

Principal Editor of 'Clay Minerals': G. E. Christidis

Ordinary Members of Council: A. Bird, J.F.W. Bowles, A. Bray, S. Broom-Fendley, H. Buss, S. Gibson,
J. Harvey, H. Hughes, S.J. Kemp, C. Pearce, C. Petrone, V. Phoenix, M. Smith, A. Thomson, E. Tomlinson,
C. Warren, M. Widdowson, D. Wray

Office address: 12 Baylis Mews, Amyand Park Road, Twickenham TW1 3HQ, UK

Website: www.minersoc.org

Tel.: +44 (0)20 8891 6600; *Fax:* +44 (0)20 8891 6599; *e-mail:* info@minersoc.org

Mineralogical Magazine is published six times per year in February, April, June, August, October and December. The Journal is now primarily an online one.

The subscription price (excluding VAT) to *Mineralogical Magazine* for volume 83 (2019), which includes print and electronic access, is £754 (USA, Canada and Mexico US\$977) and includes delivery by air; single parts are available at £145 (USA, Canada and Mexico US\$187) plus postage. The electronic-only price available to institutional subscribers is £584 (USA, Canada and Mexico US\$756). EU subscribers (outside the UK) who are not registered for VAT should add VAT at their country's rate. VAT registered subscribers should provide their VAT registration number. Orders, which must be accompanied by payment, may be sent to any bookseller or subscription agent or direct to the publishers: Cambridge University Press, UPH, Shaftesbury Road, Cambridge CB2 8BS, or in the USA, Canada, and Mexico to Cambridge University Press, Journals Fulfillment Department, 1 Liberty Plaza, Floor 20, New York, NY 10006, USA. Japanese Prices for institutions are available from Kinokuniya Company Ltd, P.O. Box 55, Chitose, Tokyo, Japan.

All subscription enquiries should be sent to: journals@cambridge.org

Front cover picture: An example of a migmatitic osumilite-bearing metapelite from Vikesdal, Norway (photo credit: Chris Clark, Curtin University). See the Hallimond lecture by Brown and Johnson (this issue).