



# Geochimica et Cosmochimica Acta

JOURNAL OF THE GEOCHEMICAL SOCIETY  
AND THE METEORITICAL SOCIETY

EXECUTIVE EDITOR: MARC NORMAN

ASSOCIATE  
EDITORS:

ROBERT C. ALLER  
JEFFREY C. ALT  
YURI AMELIN  
WOLFGANG BACH  
MIRYAM BAR-MATTHEWS  
LIANE G. BENNING  
THOMAS S. BIANCHI  
JANNE BLICHERT-TOFT  
JEAN-FRANÇOIS BOILY  
ANDREW ROSS BOWIE  
MAUD BOYET  
ALAN D. BRANDON  
JOCHEN J. BROCKS  
DAVID J. BURDige  
PETE BURNARD  
ROBERT H. BYRNE  
ELIZABETH A. CANUEL  
JON CHOROVER  
GEORGE COOPER  
CHRISTOPHER J. DAUGHNEY

NICOLAS DAUPHAS  
ANTHONY DOSSETO  
JAMES FARQUHAR  
JÉRÔME GAILLARDET  
JIWCHAR GANOR  
DANIEL E. GIAMMAR  
JITENDRA N. GOSWAMI  
JOHNSON R. HAAS  
CHRIS M. HALL  
H. RODGER HARVEY  
GEORGE R. HELZ  
SYDNEY R. HEMMING  
PETER HERNES  
GREGORY F. HERZOG  
EDWARD HORNIBROOK  
SHICHUAN HUANG  
TREVOR IRELAND  
JUN-ICHIRO ISHIBASHI  
ANDREW D. JACOBSON  
KAREN JOHANNESSEN

CLARK JOHNSON  
DAVID T. JOHNSTON  
CHRISTOPHER S. KIM  
PELEOPE L. KING  
CHRISTIAN KOEBERL  
STEPHAN M. KRAEMER  
S. KRISHNASWAMI  
ALEXANDER N. KROT  
GRAHAM A. LOGAN  
TIMOTHY J. LYONS  
TOM McCOLLUM  
FRANK McDERMOTT  
JAMES McMANUS  
ANDERS MEIBOM  
JACK J. MIDDELBURG  
FREDERIC MOYNIER  
ALFONSO MUCCI  
BJORN MYSEN  
HIROKO NAGAHARA  
ALEXANDER NEMCHIN

MARTIN NOVAK  
PEGGY A. O'DAY  
RICHARD PANCOST  
DIMITRI PAPANASTASSIOU  
ANN PEARSON  
GLEB S. POKROVSKI  
MARK REHKAMPER  
W. UWE REIMOLD  
PETER W. REINERS  
EDWARD M. RIPLEY  
CLAIRE ROLLION-BARD  
YAIR ROSENTHAL  
SARA S. RUSSELL  
JAMES RUSTAD  
NITA SAHA  
EDWIN A. SCHAUER  
JACQUES SCHOTT  
ALEX SESSIONS  
SILKE SEVERMANN  
TIMOTHY J. SHAW

STEVEN B. SHIREY  
DAVID L. SHUSTER  
JAAP S. SINNINGHE DAMSTÉ  
CARL STEEFEL  
BRIAN W. STEWART  
WEIDONG SUN  
DIMITRI A. SVERJENSKY  
MICHAEL J. TOPLIS  
PETER ULMER  
WIM VAN WESTRENEN  
BENJAMIN A.S. VAN MOY  
DEREK VANCE  
RICHARD J. WALKER  
JOSEF WERNE  
STEFAN WEYER  
JAN G. WIEDERHOLD  
ROY A. WOGELIUS  
QING-ZHU YIN  
CHEN ZHU

Volume 105

March 15, 2013

A. M. DYMISHITS, A. V. BOBROV, L. BINDI, Y. A. LITVIN, K. D. LITASOV, A. F. SHATSKIY, E. OHTANI: Na-bearing majoritic garnet in the $\text{Na}_2\text{MgSi}_5\text{O}_{12}$ - $\text{Mg}_3\text{Al}_2\text{Si}_3\text{O}_{12}$ join at 11–20 GPa: Phase relations, structural peculiarities and solid solutions . . . . .	1
X. FENG, B. C. BENITEZ-NELSON, D. B. MONTLUÇON, F. G. PRAHL, A. P. McNICHOL, L. XU, D. J. REPETA, T. I. EGLINTON: $^{14}\text{C}$ and $^{13}\text{C}$ characteristics of higher plant biomarkers in Washington margin surface sediments . . . . .	14
A. FERNÁNDEZ-GONZÁLEZ, J. CARNEIRO, D. KATSIKOPOULOS, M. PRIETO: Thermodynamic properties of the $(\text{Ba},\text{Pb})\text{SO}_4$ solid solution under ambient conditions: Implications for the behavior of Pb and Ra in the environment . . . . .	31
F. ZHANG, C. YAN, H. H. TENG, E. E. RODEN, H. XU: <i>In situ</i> AFM observations of Ca–Mg carbonate crystallization catalyzed by dissolved sulfide: Implications for sedimentary dolomite formation . . . . .	44
N. M. ABREU: A unique omphacite, amphibole, and graphite-bearing clast in Queen Alexandra Range (QUE) 99177: A metamorphosed xenolith in a pristine CR3 chondrite . . . . .	56
N. A. STARKEY, I. A. FRANCHI: Insight into the silicate and organic reservoirs of the comet forming region . . . . .	73
J. QUADE, J. EILER, M. DAERON, H. ACHYUTHAN: The clumped isotope geothermometer in soil and paleosol carbonate . . . . .	92
R. DI NAPOLI, C. FEDERICO, A. AIUPPA, M. D'ANTONIO, M. VALENZA: Quantitative models of hydrothermal fluid–mineral reaction: The Ischia case . . . . .	108
A. LICHTSCHLAG, A. KAMYSHNY JR., T. G. FERDELMAN, D. DEBEER: Intermediate sulfur oxidation state compounds in the euxinic surface sediments of the Dvurechenskii mud volcano (Black Sea) . . . . .	130
A. N. HALLIDAY: The origins of volatiles in the terrestrial planets . . . . .	146
C. SJÖSTEDT, I. PERSSON, D. HESTERBERG, D. B. KLEJA, H. BORG, J. P. GUSTAFSSON: Iron speciation in soft-water lakes and soils as determined by EXAFS spectroscopy and geochemical modelling . . . . .	172
S. REKHA, A. BHATTACHARYA, T. A. VISWANATH: Microporosity linked fluid focusing and monazite instability in greenschist facies para-conglomerates, western India . . . . .	187

Continued on outside back cover

J. GANGULY, M. TIRONE, S. CHAKRABORTY, K. DOMANIK: H-chondrite parent asteroid: A multistage cooling, fragmentation and re-accretion history constrained by thermometric studies, diffusion kinetic modeling and geochronological data . . . . .	206
B. STOLPE, L. GUO, A. M. SHILLER, G. R. AIKEN: Abundance, size distributions and trace-element binding of organic and iron-rich nanocolloids in Alaskan rivers, as revealed by field-flow fractionation and ICP-MS . . . . .	221
A. C. GAGNON, J. F. ADKINS, J. EREZ, J. M. EILER, Y. GUAN: Sr/Ca sensitivity to aragonite saturation state in cultured subsamples from a single colony of coral: Mechanism of biomineralization during ocean acidification . . . . .	240
J. A. CARTWRIGHT, J. D. GILMOUR, R. BURGESS: Martian fluid and Martian weathering signatures identified in Nakhla, NWA 998 and MIL 03346 by halogen and noble gas analysis . . . . .	255
A. HUGUET, C. FOSSE, F. LAGGOUN-DÉFARGE, F. DELARUE, S. DERENNE: Effects of a short-term experimental microclimate warming on the abundance and distribution of branched GDGTs in a French peatland . . . . .	294
T. HIEMSTRA: Surface and mineral structure of ferrihydrite . . . . .	316
C. LIU, J. SHANG, S. KERISIT, J. M. ZACHARA, W. ZHU: Scale-dependent rates of uranyl surface complexation reaction in sediments . . . . .	326
B. A. STEINMAN, M. B. ABBOTT: Isotopic and hydrologic responses of small, closed lakes to climate variability: Hydroclimate reconstructions from lake sediment oxygen isotope records and mass balance models . . . . .	342
M. TANAKA, Y. TAKAHASHI, N. YAMAGUCHI, K.-W. KIM, G. ZHENG, M. SAKAMITSU: The difference of diffusion coefficients in water for arsenic compounds at various pH and its dominant factors implied by molecular simulations . . . . .	360
A. KATZ, A. NISHRI: Calcium, magnesium and strontium cycling in stratified, hardwater lakes: Lake Kinneret (Sea of Galilee), Israel . . . . .	372
J. A. CARTWRIGHT, U. OTT, D. W. MITTLEFEHLDT, J. S. HERRIN, S. HERRMANN, S. A. MERTZMAN, K. R. MERTZMAN, Z. X. PENG, J. E. QUINN: The quest for regolithic howardites. Part 1: Two trends uncovered using noble gases . . . . .	395
J. MÖBIUS: Isotope fractionation during nitrogen remineralization (ammonification): Implications for nitrogen isotope biogeochemistry . . . . .	422
R. D. PANCAST, K. H. FREEMAN, A. D. HERRMANN, M. E. PATZKOWSKY, L. AINSAAR, T. MARTMA: Reconstructing Late Ordovician carbon cycle variations . . . . .	433
B. A. STEINMAN, M. B. ABBOTT, D. B. NELSON, N. D. STANSELL, B. P. FINNEY, D. J. BAIN, M. F. ROSENMEIER: Isotopic and hydrologic responses of small, closed lakes to climate variability: Comparison of measured and modeled lake level and sediment core oxygen isotope records . . . . .	455

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

**SciVerse ScienceDirect**

*Geochimica et Cosmochimica Acta* is abstracted/listed in *Mineral. Abstr.*, *Biol. Abstr.*, *Chem. Abstr.*, *Curr. Cont.*, *Excerpt. Med.*, *Ocean. Abstr.*, *Pollut. Abstr.*, *Sci. Abstr.*, *Sci. Cit. Ind.*, *AESIS*, *Br. Geol. Lit.*, *Deep-Sea Res. & Oceanogr. Abstr.*, *Fuel & Energy Abstr.*, *Geo. Abstr.*, *GoeRef*, *INIS Atomind.*, *Ind. Sci. Rev.*, *Int. Aerosp. Abstr.*, *E&P Hlth.*, *Mass Spectr. Bull.*, *Org. Geochem.*, *Petrol. Abstr.*, *Sel. Water Res. Abstr.*, *So. Pac. Per. Ind.*, *Soils & Fert.*, *Gas Process. & Ppl.*, *W.R.C. Inf.*, *Meteor. & Geoastrophys. Abstr.*, *Off. Tech.* Also covered in the abstract and citation database *SciVerse Scopus*. Full text available on *SciVerse ScienceDirect*.

