

Elements

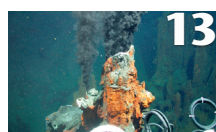
An International Magazine of Mineralogy, Geochemistry, and Petrology



Volume 16, Number 1 • February 2020

Abiotic Hydrogen and Hydrocarbons in Planetary Lithospheres

Guest Editors: **Laurent Truche**, **Thomas M. McCollom**, and **Isabelle Martinez**



13

Hydrogen and Abiotic Hydrocarbons: Molecules that Change the World

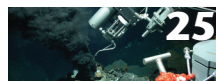
Laurent Truche, Thomas M. McCollom, and Isabelle Martinez



19

Abiotic Sources of Molecular Hydrogen on Earth

Frieder Klein, Jesse D. Tarnas, and Wolfgang Bach



25

Abiotic Synthesis of Methane and Organic Compounds in Earth's Lithosphere

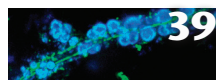
Eoghan P. Reeves and Jens Fiebig



33

The Behavior of H₂ in Aqueous Fluids under High Temperature and Pressure

Elena F. Bazarkina, I-Ming Chou, Alexander F. Goncharov, and Nikolay N. Akinfiev



39

Abiotic Hydrogen and Methane: Fuels for Life

Bénédicte Ménez



47

Hydrogen, Hydrocarbons, and Habitability Across the Solar System

Christopher R. Glein and Mikhail Yu. Zolotov

Elements is published jointly by the Mineralogical Society of America, the Mineralogical Society of Great Britain and Ireland, the Mineralogical Association of Canada, the Geochemical Society, The Clay Minerals Society, the European Association of Geochemistry, the International Association of Geochemistry, the Société Française de Minéralogie et de Cristallographie, the Association of Applied Geochemists, the Deutsche Mineralogische Gesellschaft, the Società Italiana di Mineralogia e Petrologia, the International Association of Geoanalysts, the Polskie Towarzystwo Mineralogiczne (Mineralogical Society of Poland), the Sociedad Española de Mineralogía, the Swiss Society of Mineralogy and Petrology, the Meteoritical Society, the Japan Association of Mineralogical Sciences, and the International Association on the Genesis of Ore Deposits. It is provided as a benefit to members of these societies.

Elements is published six times a year. Individuals are encouraged to join any one of the participating societies to receive *Elements*. Institutional subscribers to any of the following journals—*American Mineralogist*, *Clay Minerals*, *Mineralogical Magazine*, and *The Canadian Mineralogist*—also receive one copy of *Elements* as part of their 2020 subscription. Institutional subscriptions are available for US\$165 (US\$180 non-US addresses) a year in 2020. Contact the executive editor (jrosso.elements@gmail.com) for information.

Copyright 2020 by the Mineralogical Society of America.

All rights reserved. Reproduction in any form, including translation to other languages, or by any means—graphic, electronic, or mechanical, including photocopying or information storage and retrieval systems—without written permission from the copyright holder is strictly prohibited.

Publications mail agreement no. 40037944

Printed in USA

ISSN 1811-5209 (print)

ISSN 1811-5217 (online)

elementsmagazine.org

pubs.geoscienceworld.org/elements

GeoScienceWorld
Participating Publisher



DEPARTMENTS

Editorial – The Once and Future Hydrogen Economy	3
From the Editors	4
Triple Point – Global Flow of Scholarly Publishing and Open Access	6
Perspective – New Perspectives in the Industrial Exploration for Native Hydrogen	8
Meet the Authors	10
Society News	
International Association on the Genesis of Ore Deposits	53
Mineralogical Society of Poland	54
Association Internationale pour l'Étude des Argiles	55
Mineralogical Society of America	56
Association of Applied Geochemists	58
Société Française de Minéralogie et de Cristallographie	59
Mineralogical Association of Canada	60
Clay Minerals Society	62
Japan Association of Mineralogical Sciences	63
Deutsche Mineralogische Gesellschaft	64
International Mineralogical Association	66
Geochemical Society	67
Mineralogical Society of Great Britain and Ireland	68
European Association of Geochemistry	70
Meteoritical Society	72
CosmoElements – MetBase.org as a Research and Learning Tool for Cosmochemistry	73
Calendar	76
Job Posting	76