

# Elements

An International Magazine of Mineralogy, Geochemistry, and Petrology



Volume 10, Number 3 • June 2014

*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 Geonanalysts, the Polskie Towarzystwo Mineralogiczne (Mineralogical Society of Poland), the Sociedad Española de Mineralogía, the Swiss Society of Mineralogy and Petrology, the Meteoritical Society, and the Japan Association of Mineralogical Sciences. 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*, *Clays and Clay Minerals*, *Mineralogical Magazine*, and *The Canadian Mineralogist*—also receive one copy of *Elements* as part of their 2014 subscription. Institutional subscriptions are available for US\$160 (US\$175 non-US addresses) a year in 2014. Contact the executive editor (tremblpi@ete.inrs.ca) for information.

Copyright 2014 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)

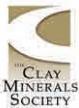
ISSN 1811-5217 (online)

[www.elementsmagazine.org](http://www.elementsmagazine.org)

[www.elements.geoscienceworld.org](http://www.elements.geoscienceworld.org)

**GeoScienceWorld**  
Participating Publisher

**MIX**  
Paper from  
responsible sources  
FSC® C006300



**ABOUT THE COVER:**  
Kaolinite's first sophisticated use was in porcelains from Jingdezhen, China. Chinese plate (47.6 cm across) from the Yuan period (1271–1368); Jingdezhen ware; porcelain with underglaze, cobalt-blue decoration, from the collection of the Seattle Art Museum. PHOTO: PAUL MACAPIA, REPRODUCED WITH PERMISSION.

Background image: scanning electron microscope image (false color) of well-ordered kaolinite from sedimentary-hosted kaolinite deposit in Georgia, USA; width of view is 4 µm. PHOTO: ROBERT J. PRUETT, IMERYS OILFIELD SOLUTIONS

## Kaolin

Guest Editors: **Paul A. Schroeder** and **David L. Bish**



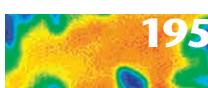
177



183



189



195



201



207

### Kaolin: From Ancient Porcelains to Nanocomposites

Paul A. Schroeder and Gary Erickson

### Kaolin-Group Minerals: From Hydrogen-Bonded Layers to Environmental Recorders

Etienne Balan, Georges Calas, and David L. Bish

### Mining and Processing Kaolin

Jessica Elzea Kogel

### Interactions of Kaolin Minerals in the Environment

Randall T. Cygan and Kazue Tazaki

### From Platy Kaolinite to Nanorolls

Christian Detellier and Robert A. Schoonheydt

### Kaolins and Health: From First Grade to First Aid

Lynda B. Williams and Stephen Hillier

### DEPARTMENTS

**Editorial** – Kaolins: Nanominerals with a Proud Heritage . . . . . 163

**From the Editors** – Transition . . . . . 164

**People in the News** – Tait; Humboldt Foundation Awardees . . . . . 166

**CosmoElements** – Black Beauty . . . . . 168

**A Life in Science** – Setting Up or Renovating a Laboratory . . . . . 170

**Perspective** – An Artist's Life in Jingdezhen, China . . . . . 172

**Meet the Authors** . . . . . 174

**Society News** . . . . . 174

European Association of Geochemistry . . . . . 214

Association of Applied Geochemists . . . . . 216

Japan Association of Mineralogical Sciences . . . . . 217

Deutsche Mineralogische Gesellschaft . . . . . 218

The Clay Minerals Society . . . . . 220

Meteoritical Society . . . . . 221

Mineralogical Society of Great Britain and Ireland . . . . . 222

Geochemical Society . . . . . 224

Mineralogical Society of America . . . . . 226

International Association of GeoChemistry . . . . . 228

Mineralogical Association of Canada . . . . . 230

Société Française de Minéralogie et de Cristallographie . . . . . 232

Sociedad Española de Mineralogía . . . . . 232

**Book Review** – Developing a Talent for Science . . . . . 233

**Travelogue** – A Visit to Hadjer el Hamis, Chad . . . . . 234

**Calendar** . . . . . 236

**Parting Shots** – Friendly Brick . . . . . 237

**Advertisers in This Issue** . . . . . 240