THIS ISSUE
Take a small crystal of garnet, a common mineral with built-in chronometers and uncommon properties due to its crystalline structure, study it, and suddenly you have insights on large-scale processes like plate subduction, timing and duration of metamorphism, seismicity, and more. The authors in this issue, assembled by guest editors Ethan Baxter, Mark Caddick, and Jay Ague, take us on a whirlwind tour of the mantle and crust, and inform us on the technological applications and the place in history of this beloved mineral.

EDITORIAL MEETING AT GSA
The editors met in Denver for their annual meeting on Saturday, October 26, just prior to the Geological Society of America conference. This was a departure from the last several years, when our meeting was held in conjunction with the Goldschmidt Conference. We welcomed Gordon Brown, whose term of office will officially start on January 1. A large portion of our meeting was devoted to evaluating the 18 thematic proposals we have received for our 2015 lineup. Overall, we strive to ensure that, in any given year, there is a mix of mineralogy, geochemistry, and petrology topics. We ask ourselves several questions when we evaluate a proposal: Is Elements the right venue for this proposal? Will this topic be relevant to a significant proportion of our readership? Is the proposed list of authors diversified? And Tim Drever’s ultimate question: “Would I want to read about this topic if I was stuck in an airport for several hours?” Six proposals have been selected, and proposers have been asked to finalize their list of authors for final approval.

Pierrette Tremblay receiving the Distinguished Public Service Award from John Hughes (left) at the Mineralogical Society of America’s awards luncheon in Denver. The citationist was Rod Ewing (right).

THANKS
We thank the guest editors and authors who contributed to the six issues of volume 9. Their efforts to bring their science to the nonspecialist audience of Elements and to respect the constraints of Elements regarding deadlines and article length are much appreciated. We also acknowledge the contributions of reviewers, copyeditors, and proofreaders, who toil in the background.


2014 PREVIEW
Finally, we are pleased to introduce our lineup for 2014. We are confident that there will be something of interest for everyone.

Best wishes to everyone for the coming year!

Georges Calas, John Valley, Patricia Dove, and Pierrette Tremblay
ASTEROIDS: LINKING METEORITES AND PLANETS

GUEST EDITORS: Catherine Corrigan (Smithsonian Institution, Washington) and Guy Libourel (Observatoire de la Côte d’Azur, Nice, and CRPG, Université de Lorraine)

Asteroids number in the millions. Orbiting the Sun between Mars and Jupiter, they are thought to be the shattered remnants of small bodies formed within the young Sun’s solar nebula and that never accreted large enough to become planets. By presenting several case studies, this issue will present what we know about the physical and chemical compositions of asteroids and how they are related to meteorites and planet formation. We will show why these “minor bodies” are key to understanding how the Solar System formed and how it works; why they are clues to the origin of life, having possibly delivered organics and water to Earth; and why the international space agencies have funded sample-return missions to asteroids.

- Asteroids: New challenges, new targets
  Guy Libourel and Catherine Corrigan

- Asteroid formation and physical properties
  Patrick Michel (Observatoire de la Côte d’Azur, Nice)

- Forging asteroid-meteorite links
  Edward Cloutis (University of Winnipeg), Richard Binzel (Massachusetts Institute of Technology), and Michael J. Gaffey (University of North Dakota)

- Asteroid 2008 TC$_{3}$ and the fall of Almahata Sitta, a unique meteorite breccia
  Cyrena Goodrich (Planetary Science Institute, Tucson), Addi Bischoff (University of Münster), and David O’Brien (Planetary Science Institute, Tucson)

- Unique, antique Vesta
  Harry T. McSween (University of Tennessee), Cristina De Sanctis (Institute for Space Astrophysics and Planetology, Italy), Thomas H. Prettyman (Planetary Science Institute, Tucson), and the Dawn Science Team

- Asteroid Itokawa: A source of ordinary chondrites and processes on its surface
  Akira Tsujiyama (Kyoto University)

KAOLIN: FROM ANCIENT PROCELAINS TO NANOCOMPOSITES

GUEST EDITORS: Paul A. Schroeder (University of Georgia) and David L. Bish (Indiana University)

Although bearing the simple name “kaolin,” this natural material has a variety of geologic origins and many industrial applications significant to society. Known as china clay, kaolin has a long history dating back to Kauling, China, and its first exploitation in the field of ceramics. Kaolin is one of nature’s most abundant nanomaterials. Its fine, clay-sized particles, unique shapes, and layered structures make it central to Earth’s near-surface critical zone. Concerns for energy efficiency and environmental awareness in the industry have led to advances in mining and reclamation practices. The crystallographic and elemental varieties of kaolin require them to be carefully characterized as they lend themselves for use in plastics, papers, pigments, and ceramics. Kaolin minerals are being probed with computational chemistry and new spectroscopic tools to expand their applications and to understand their significance in biology. We are now exploring how kaolin can be nanocomposited to create materials with novel properties.

- History of kaolin
  Paul A. Schroeder and Gary Erickson (Macalester College)

- Kaolin types and structures
  Etienne Balan (IRD and UF, France), David L. Bish (Indiana University), and Georges Calas (UPMC, Paris)

- Kaolin mining and processing
  Jessica Elzea-Kogel (IMERYS)

- Toward understanding the interactions of kaolin minerals in the environment
  Randall T. Cygan (Sandia National Laboratories) and Kazue Tazaki (Kanazawa University)

- Kaolin nanocomposites
  Christian Detellier (University of Ottawa) and Robert Schoonheydt (KU Leuven)

- Kaolin and health
  Lynda Williams (Arizona State University) and Stephen Hillier (The James Hutton Institute, Aberdeen)

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Volume 10, Number 3 (June)
and from the scale of a pebble to as large as an entire river basin. Cosmogenic nuclides accumulate. Hence, these nuclides provide rates of erosion, dating one in a million billion.

The Earth's surface is the thin, ever-changing layer on which we live. The geochemical study of cosmogenic nuclides is currently revolutionizing our understanding of the processes that shape this surface layer by providing their rates and dates. The underlying physical principles are simple and elegant: when rock or soil moves into the shallow zone of surface irradiation, cosmic rays interact with elements in minerals to produce very rare isotopes—the radioactive nuclides $^{10}\text{Be}$, $^{14}\text{C}$, $^{26}\text{Al}$, $^{36}\text{Cl}$, and $^{53}\text{Mn}$ and the rare gases $^{3}\text{He}$ and $^{21}\text{Ne}$. At this exact moment, $^{10}\text{Be}$ from oxygen in the atmosphere, which is then deposited on the Earth's surface. Cosmic rays also produce cosmogenic $^{10}\text{Be}$ in situ within rocks. Both varieties of this rare radioactive nuclide serve to date the time when glacial ice disappeared at the Forno glacier, Bergell Alps, Switzerland. 

PHOTO: FRIEDHELM VON BLANCKENBURG

The realization that unconventional hydrocarbons, such as gas and oil shale, oil sands, and heavy oil, can now be exploited more effectively and economically has stimulated exploration and exploitation on a global scale. This has led to a new economic and environmental landscape in energy matters that we are only now starting to understand. Exploiting unconventional hydrocarbons requires additional technology, energy, and capital compared to the industry standard. This thematic issue will address the geologic and geochemical nature of these resources and their impact on global socioeconomics and the environment.

- A global view of unconventional hydrocarbons
  Michael Arthur and David R. Cole

- Dash for gas, 21st-century style
  Seth Blumshack (Pennsylvania State University)

- From source rock to reservoir: The evolution of self-sourced unconventional-resource plays
  L. Taras Bryndzia and Neil R. Braunsdorf (Shell Oil Co.)

- Oil sands and heavy oil: Origin, exploration, emissions, and alternative futures
  Steve Larter (University of Calgary) and Ian Head (University of Newcastle)

- Fingerprinting formation waters using stable isotopes and other natural tracers
  Benjamin Rostro (University of Alberta) and Sergey Arkadaksky (Isobrine Solutions Inc.)

- Abiotic gas: Atypical but not rare
  Giuseppe Etope (Istituto Nazionale di Geofisica e Vulcanologia) and Martin Schöell (GasConsult International)

The nuts and bolts of nuclide production
Tibot J. Dunai (University of Cologne) and Nathaniel Lifton (Purdue University)

- Shaken and stirred: Earthquakes, faults and toppled blocks
  Lucilla Benedetti (Cerege, Aix-en-Provence, France) and Jérôme van der Woerd (Institut du Globe de Strasbourg)

- Making soil
  Jean L. Dixon (Montana State University) and Cliff Riebe (University of Wyoming)

- Dating disappearing ice
  Susan Ivy-Ochs (ETH Zürich) and Jason P. Briner (State University of New York at Buffalo)

- Gridding down mountains
  Darryl E. Granger (Purdue University) and Mirjam Schaller (Universität Tübingen)

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PHOTO: FRIEDHELM VON BLANCKENBURG

In natural systems, graphitic carbons are widespread and exhibit an infinite range of structure, from amorphous-like compounds (e.g. soots, charcoal) to crystalline graphite through a myriad of turbostratic structures (e.g. coals, kerogens). A variety of structures and chemistries down to the nanometer scale control the physicochemical properties of graphitic carbons and determine their behavior and fate during geological processes. This issue of Elements will present recent advances in our understanding of the formation of graphitic carbons (graphitization, fluid deposition) and will discuss their role as actors and/or tracers in cosmochemistry, geobiology, geochemistry, and petrology. In particular, graphitic carbons may carry an important biological legacy in rocks, they may be used for assessing the thermal history of rocks, and they buffer the chemical composition of fluids in equilibrium with rocks. The issue will also present an introduction to the new carbon nanomaterials (e.g. graphene, carbon nanotubes), which bear structural similarities to natural graphitic carbons, and to their technological applications.

- Graphitic carbons
  Olivier Beyssac and Douglas Rumble

- From organic matter to graphite: Graphitization
  Olivier Beyssac (UPMC Paris) and Peter Buseck (Arizona State University)

- Graphitic carbons as traces of life
  Sylvain Bernard (Muséum National d'Histoire Naturelle, Paris) and Dominic Papineau (University College London)

- Hydrothermal graphite
  Douglas Rumble (Carnegie Institution of Washington)

- Laboratory studies of carbonaceous stardust
  Thomas J. Bernatowicz, T. Kevin Croat, and T. Dalton (Washington University in St Louis)

- Graphene, the new nanotechnology leader
  Michele Lazzeri (UPMC Paris) and A. Barreiro Megino (Columbia University)
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