

IS GEOCHEMISTRY IMPORTANT?



Is geochemistry important? If you attended the recent Goldschmidt Conference in Davos, this is not a question that would come to mind. With over 2800 attendees presenting 1680 talks and 1350 posters organized into twenty different themes and 127 sessions over five days, the Goldschmidt Conference was a huge success. Plenary sessions featured lectures on topics such as the Hadean Earth, by Mark Harrison, and major events in the recent history of the solar system, by Ken Farley. Concerning that part of the solar system in which we live, there were lectures on nanogeoscience and its relation to cleaner water, more oil, and waste management, by Susan Stipp; biogeochemical

feedbacks in terrestrial ecosystems and climate, by Susan Trumbore; and the human impact on the geochemical landscape, by Marty Goldhaber. Special sessions, such as “Magma Generation and Evolution and Global Tectonics,” in honor of Peter Wyllie, and “Mineral/Water Interface Chemistry – The Legacy of Stumm and Schindler,” drew standing-room-only crowds. Most importantly, the average age of the attendees appeared to be several decades less than my own. I am used to looking out over audiences whose heads are either bald or grey—but the Goldschmidt seems to have tapped into the fountain of youthful enthusiasm and serious intent. In one session, youngsters on both sides (male to the right and female to the left) were taking notes! I felt like an old man on a park bench, awkwardly separating two excited strangers who were about to meet. The future of geochemistry is secure.

During this meeting, Pierrette Tremblay, managing editor of *Elements*, hand-delivered the latest issue on gems—as always, interesting and beautifully illustrated. I thumbed through this issue during one of these crowded sessions. A particularly appropriate article by George Rossman tied gemology to geochemistry. However, the title of one of the last articles in the issue gave me pause, “Why Study Mineralogy?” by Tomas Feininger. There it was again—that small clarion call for the importance of mineralogy, but in this case against the background of the roar of activity at Goldschmidt. Tomas’ article is excellent, and his description of his first lecture in a mineralogy course offers a good example of how to relate a societal issue, asbestos, to the study of mineralogy. Still, why the special pleading for the importance of mineralogy? I think that it is because most of us, mineralogists, feel that we are under assault. Witness the MSA-Talk list discussion of the value of optical mineralogy in the face of its rather rapid elimination from most curricula. Mineralogists spend considerable time talking about the demise of their discipline and trying to demonstrate its relevance. But there is none of this handwringing to be found among geochemists. The Goldschmidt simply embraced mineralogy with sessions such as “High-Pressure Mineral Physics – A Key to Earth Structure,” in honor of MSA medalist Ronald Cohen, and hosted the plenary lecture by Charlie Prewitt on ABX_3 compounds on the occasion of his receiving the inaugural International Mineralogical Association (IMA) Medal. Still, Prewitt’s lecture on this important family of compounds, including the most abundant mineral in Earth’s interior, drew a thin crowd. Where were my young note-takers? Did the title hint at too much mineralogy?

Does mineralogy need special pleading for relevance? I am not paranoid, but I can see a trend that stretches over many decades. Mineralogy has evolved into a number of smaller, niche communities: gemology, clay mineralogy, mineral physics, environmental mineralogy, and mineral sciences, which are often isolated from one another. As an example, the combined membership of the Mineralogical Society of America and The Clay Minerals Society is nearly 3200, but only 107 individuals belong to both societies. This is typical of the limited overlap in membership among the fifteen participating societies in *Elements*. Other communities—low-temperature and environmental mineralogists—have been absorbed by and find their most appropriate home in geochemistry. The field of mineral physics is exciting and burgeoning, but the members of this community are most often found at meetings of the American Geophysical Union, and in fact, this community does not cover all of mineral physics, but rather focuses on the high-pressure behavior of minerals in Earth’s interior.

Would a name change help? In the mid-1970s, some MSA members were not satisfied with the breadth of topics covered by *American Mineralogist*, and in 1977 the first issue of *Physics and Chemistry of Minerals* appeared. In 1994, on the occasion of the 75th anniversary of MSA, the then president Jim Papike proposed a change in the name of the *American Mineralogist* to *Earth and Planetary Materials*. There was much discussion—see the very interesting essays in *The Lattice* by J.B. Thompson and Bruce Watson (www.minsocam.org/MSA/lattice/97Nov.htm#WHAT'S%20IN%20A%20NAME? and www.minsocam.org/MSA/lattice/98feb.htm#From%20the%20President)—but the name remained the same. In the end, only a by-line, “An International Journal of Earth

and Planetary Materials,” was added to the old title. The *Reviews in Mineralogy* became the *Reviews in Mineralogy and Geochemistry* in 2000. The titles of mineralogy textbooks announce the subject of “mineral science.” Some of the most prominent members of the mineralogical community often publish outside of our mineralogical journals. Mineralogy is not listed as a subdiscipline of the geosciences in the review of U.S. graduate programs, now underway by the National Research Council.

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We can spend too much time worrying about what we are called or trying to protect old names, but the words we use are important in communicating with our colleagues and maintaining ourselves, mineralogists, at the core of the geosciences. In the 1960s, Bill Fyfe wrote a thin volume entitled *Geochemistry of Solids*. Why the reference to geochemistry? This harkens back to the time of V.M. Goldschmidt, when the subjects of crystal chemistry and geochemistry were one and the same.

Out of curiosity, I checked Fyfe’s Roebling Medal citation and acceptance speech of 1995. Fyfe’s message makes a fitting end to this essay: “The earth sciences are in trouble today. I think we have partly failed to explain to society what we do and why it is so important.” He went on to list the “megaproblems” that face society: energy, climate, clean water, soil quality, managing wastes (including nuclear waste), and providing raw materials, and he called for “new teams of experts who can communicate.” He even noted the importance of biomineralization and geochemical cycles, such as the carbon cycle, and the possibility “to dispose of CO_2 from stationary power plants in appropriate rocks.” Fyfe’s vision lives on in the Goldschmidt Conference. As for “mineralogy,” it is an important skill, but it no longer appears to drive a larger scientific agenda. For myself, I have decided to become a *geochemist of solids!*

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