Voids caused by the dissolution of tapered lath-shaped crystals on Meridiani Planum, Mars. The field of view is 4.8 cm across. NASA/JPL IMAGE 16-JG-02-MI1-B035R1_BR2

SCIENCE IN THE GARAGE

I enjoyed very much volume 2, number 3 of *Elements*, which was devoted to water on Mars. The timely and thorough reviews are invaluable to help students learn about these exciting new developments. I have recently completed an experiment that has some relevance to water on Mars. The rover Opportunity, which still functions magnificently on the surface of Mars, has been sending back data that suggest magnesium sulfates are present on the surface of the planet. When I heard this I wondered what phase you would obtain when you crystallize magnesium sulfate from a saturated solution at subzero Celsius temperatures? My unheated garage in Kingston, Canada, was just the right temperature in early January, so I bought some epsom salts at the local drug store and put a saturated solution and a petrographic microscope in the garage. After a few days I had grown crystals that obviously were not the orthorhombic 7 hydrate, epsomite. What's more, the crystals had tapered edges that are very similar to the voids observed using the microscopic imager on Opportunity. The phase diagram predicts a 12 hydrate. I managed to transport a crystal, packed in snow in a cooler, from my garage across town to the diffractometer lab and into the N_2 stream of the diffractometer before it melted. The crystal structure solution showed that the crystals were in fact $MgSO_4 \bullet 11H_2O$. What is most interesting and relevant to the Martian surface is that this compound melts incongruently to a slurry of one mole of $MgSO_4 \bullet 7H_2O$ and four moles of water with a very low latent heat of fusion. If there was a deposit of $MgSO_4 \bullet 11H_2O$ on the Martian surface, it could incongruently melt and rapidly evolve large amounts of water, which could explain some of the outwash features and chaotic terrain observed on Mars. Who says you can't do science in your garage anymore? $MgSO_4 \bullet 11H_2O$ is predicted as a valid mineral species on Earth where magnesium sulfate crystallizes near 0°C. This work will appear in the November issue of *Geology*.

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GRACE UNDER PRESSURE

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IN PRAISE OF POLARIZED LIGHT MICROSCOPY

As the general secretary of the Russell Society, I am fortunate to be the recipient of a copy of *Elements*. In addition to the fascinating articles on the early Earth in the August 2006 edition, an interesting article by Dan Kile extolled the virtues of polarized light microscopy (PLM) and its decline in geoscience education. Perhaps the only benefit of this reduction in the teaching of PLM in colleges and universities has been the appearance of reasonably high-quality polarized light microscopes on the secondhand market; some of these microscopes have been purchased by members of the amateur mineralogical community. In the UK, and there are no doubt equivalent groups in other countries, a number of members of the Russell Society and the British Micromount Society have been wrestling with the intricacies of their microscopes and, whilst most of us have had little or no formal training in the use of PLM, some of our more-experienced members (Max Wirth and Don Blake) have summarised the ways in which PLM may be used in the process of mineral identification (usually as slides of ~30-micron mineral grains in epoxy resin). Using these summaries and the standard textbooks, together with micro-chemical techniques, the number of possibilities for an unknown mineral can be markedly reduced, and in some cases the process of mineral identification can be relatively straightforward. This approach can be of particular value to the amateur mineralogist as it can reduce the number of times that more sophisticated analytical methods need to be used. Bearing these points in mind, I agree with Dan Kile that it is important that PLM remains an active component of mineralogical, petrological and analytical courses so that specialists in this useful technique continue to be available to provide instruction and support for both professional and amateur mineralogists.

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ELEMENTS IN THE CLASSROOM

I received my *Elements* magazine this month and found it to be an exceptional volume! I wonder if it might be possible to purchase 30 individual copies of this issue, so that I may use it in my astrobiology class at the University of Hawaii.

Karen Meech, Director
University of Hawaii NASA Astrobiology Institute, USA

Editors' reply: Yes indeed it is possible to order extra issues to use in the classroom. It was certainly envisaged by founding editor Rod Ewing that these collections of thematic papers would be ideal to use in the classroom. We are thrilled to see it happening.

FÉLICITATIONS

J'en profite pour vous dire que le travail éditorial sur *Elements* est fantastique. C'est une des seules revues scientifiques que je lis en entier, du début à la fin. En fait, la raison principale pour laquelle je suis devenu membre de l'Association minéralogique du Canada est de m'assurer que je ne manquerai pas de numéro d'*Elements*. Bravo!

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