

The Arsenic Issue

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The April 2006 issue of *Elements* magazine [1], of which I was privileged to be the Guest Editor, was on the topic of 'Arsenic'. In the time since the publication of this highly cited issue, there have been over 3000 more papers published of relevance to the topics discussed in this issue, as well as numerous items in the popular press. In many ways, arsenic is an ideal subject for an issue of *Elements*. It is a subject with a rich historical and cultural hinterland, and it is truly interdisciplinary, with scope for important contributions from mineralogists, geochemists, microbiologists, biochemists, toxicologists and epidemiologists. More importantly, in parts of the world, it is one of currently great social and humanitarian significance.

The 'explosion' of literature on arsenic is associated with the impact on human health of even very small concentrations of this element in food and drinking water. The origins of arsenic contamination can be associated with minewastes, former industrial sites, or contaminated aquifers; the latter contributing to a major humanitarian crisis in parts of SE Asia. In describing the original sources of arsenic and, where appropriate, the transport and release of arsenic in the environment, a number of the classic types of behaviour of the chemical elements as described by VM Goldschmidt himself can be observed.

In this presentation, just some of the many key controls of the origin, transport and release of arsenic will be considered, with emphasis on contributions to understanding made by mineralogical and geochemical investigations. Particularly in the most distressing examples of contamination of drinking water, the systems involved in promoting the release of arsenic require an appreciation of complex mineral-water-organic molecule-microbe interactions. Understanding the processes involved may also provide insights into (both *in situ* and *ex situ*) remediation strategies. As pointed out by Vaughan and Polya in a 2013 issue of *Elements* [2], the arsenic contamination problem and its solution is a case where mineralogy (*sensu lato*) really does matter.

[1] Vaughan (2006) *Elements* **2**, 71-107 [2] Vaughan & Polya (2013) *Elements* **9**, 315-316