A Method of Atomic Transformation III: Synthesis of Gold from Silicon

Article · January 2019

2 authors:

Peter Grandics
A-D Research Foundation

George Egely
Egely res.corp

A Method of Atomic Transformation, III: Synthesis of Gold from Silicon

Peter Grandics,* George Egely and Maria Balint*****

Abstract *— Previously, we published research showing that atomic transformation (transmutation) can be carried out under low-energy conditions akin to chemical catalysis. Among numerous elements absent from the starting material, we observed the formation of gold in the heated samples. In this study, we quantify the gold in the samples and show the temperature dependence of its concentration.*

Results and Discussion

Previously, we have shown that heating synthetic silicon dioxide nanoparticles[1] in an oven led to the appearance of a variety of elements, including Ca, K, Fe, Ti, Mn, Cu, Zn, Zr, W, Ag, U, Au, Hg and Pd in discreet "nuggets" as electron-dense grains. This was demonstrated by SEM-EDS analysis using a Philips Quanta 600 instrument.

In one example, gold crystals were observed growing out of a molten silicon dioxide sphere (see Figures 1 and 2). No Au was detected in the starting silicon dioxide sample (not shown).

Subsequent EDS analysis of the electron-dense grains demonstrated Au as the main reaction product, along with some Pd and Hg (Figure 3, on next page).

Qualitative results were obtained in these experiments. To obtain quantitative data on the bulk sample, we performed additional heating experiments at 600°C, 800°C and 1000°C. This was done to explore potential temperature effects on the concentration of Au in the heated samples. Inductively Coupled Plasma Mass Spectrometry (ICP-MS) was used to determine gold concentrations.

The data show a temperature-dependent increase of Au in the samples:

Temperature	600°C	800°C	1000°C
Au average ppm	0.18	0.26	0.59

Trace amounts of Hg (0.01 ppm) also appeared in the 1000°C sample.

The results suggest that normal geochemical conditions would be sufficient to produce many of the metals present in Earth's crust, perhaps even all of them.[1] Si is a major constituent of Earth's crust; veins of quartz often harbor noble metals. We have described a method that can be used to produce Au from SiO_2 (quartz). While the yield of gold is currently low, we believe that refinements of reaction conditions can lead to improved results.

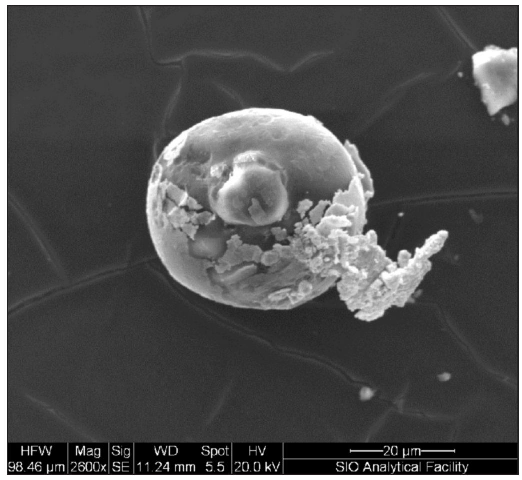

Figure 1. SEM image of the heated sample area.

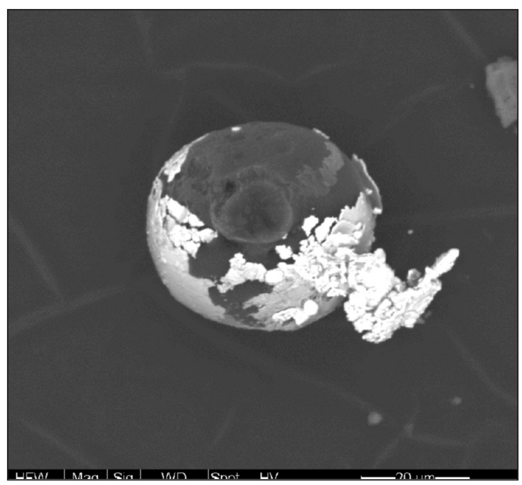

Figure 2. Backscatter image of sample area.

*A-D Research Foundation (Carlsbad, CA)
Email: pgrandics@earthlink.net
**Egely Research Corp. (Hungary)
***Balint Analitika (Hungary)

Figure 3 of this paper appears on the next page (p. 31).

Acknowledgement

We are indebted to Gregory M. Vogel for his valuable comments and suggestions on the manuscript.

Reference

1. Grandics, P. 2009. "A Method of Atomic Transformation, I," *Infinite Energy*, 15, 85, 30-36.

Element	App Conc.	Intensity Corrn.	Weight%	Weight% Sigma	Atomic%
O K	6.47	0.7685	44.11	1.17	76.88
Al K	0.18	0.8665	1.09	0.16	1.13
Si K	2.80	0.9689	15.11	0.46	15.01
Ca K	0.09	0.8856	0.55	0.15	0.38
Pd L	1.15	0.6745	8.91	0.68	2.33
Au M	3.87	0.7591	26.65	1.03	3.77
Hg M	0.58	0.8475	3.57	0.88	0.50
Totals			100.00		

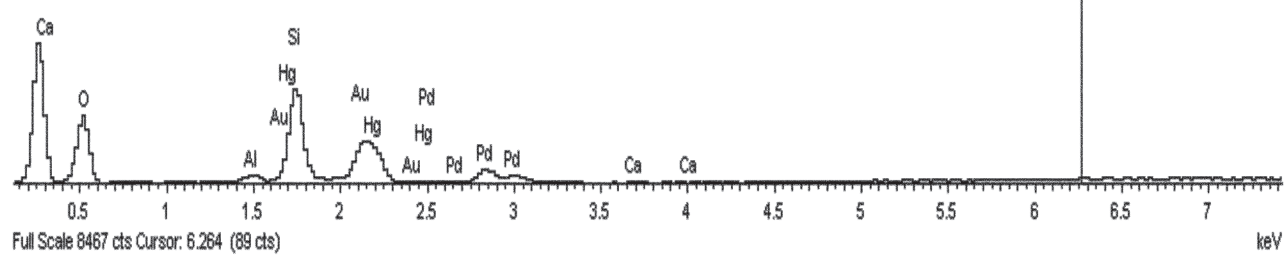

Figure 3. EDS analysis of the electron-dense grains.