

Analytical Services

- Scanning electron microscopy (JEOL JSM-6300) with energy dispersive x-ray analysis
- Scanning electron microscopy (JEOL JSM-6300F) field emission very high resolution SEM
- Electron Probe Microanalyzer (JEOL JXA-8600) EDS + 4 wavelength dispersive spectrometers (fully computer controlled) with multiple crystals per spec
- Auger Electron Spectroscopy (JEOL JAMP-7800) with hemispherical analyzer, Zalar rotation and EDS x-ray detector
- Optical microscopy – Leitz Ergolux, Mitutoyo long working distance and Wild M3 stereo
- Profilometry – Dektak 3030 (10nm sensitivity)
- Microhardness – Zeiss
- Metallography – sectioning, mounting and polishing for all materials
- Small particle (10µm sectioning)
- CO2 snow jet, plasma & solvent cleaning
- Reverse engineering
- Litigation
- Patent Infringement
- Expert Testimony
- Forensics

Note: all data is digital and can be emailed for immediate transferal without extra charge.

For our certifications see
www.GellerMicro.com

Geller MicroAnalytical

Geller MicroAnalytical Laboratory, Inc. is certified to ISO-9001:2000 by NQA and ANSI Z540A and 17025 by ACLASS, and 10CFR50, appendix B by Alion, providing analytical services and design and manufacturing of a limited number of unique products that are directly related to microanalysis. Some of these products, such as our magnification reference standard and ion sputter standards are NIST and NPL (National Physical Laboratory in the U.K.) traceable.

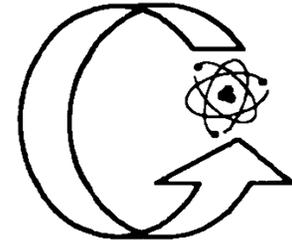
Our staff takes pride in performing state-of-the-art analyses on difficult specimens. As our satisfied repeat clients and publications reveal, we have developed several techniques for solving your analytical problems.

Rest assured your confidentiality will be maintained with the utmost care as our company concentrates on satisfying your needs. We are only a phone call away. We pride ourselves in direct communication with our customers. We are here when you need us!

Quick Turnaround, all digital results

Key staff positions:

- Joe Geller, President. Surface analysis, interfaces, thin films, coatings, contamination ID, microscopy
- Menghua Liu, PhD., Research Scientist, Electron Probe Microanalysis, magnification standard calibration, software development
- Paul Engle. QC Manager, sample preparation, profilometry, & microhardness.



GELLER MICROANALYTICAL LABORATORY, Inc.

*...where a microgram of understanding
is worth a ton of guessing.*

Mineral Analysis Expertise

Specializing in Kimberlites & Platinum Group Materials

The laboratory you are looking for...

- **ISO- 9000:2000 certified**
- **ISO-17025 and Z540A accredited**
- **Audited to 10CFR50, appendix B**

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Our Mission: to provide

Geller MicroAnalytical Laboratory has extensive expertise in probing the mineral groups described below. Our staff has a PhD. Mineralogist who specializes in EPMA application to minerals and mineral geochemistry, with a concentration on mantle derived minerals and PGE (Platinum Group Elements) & other highly siderophile and siderophile elements.

PGM (Platinum Group Minerals) and gold related minerals

Geller MicroAnalytical Laboratory develops new standard preparation technology and micro analytical standards in house. As a result, the lab has an abundance collection of PGE (Platinum Group Elements) and all other precious metal standards, which allows us to generate very high accuracy quantitative analyses. The laboratory also has developed techniques to handle peak overlaps that are very common and challenging when analyzing elements in the PGE group. To address the overlap issues we have an on-going project which will provide guidance on optimizing our techniques on handling these issues. We also have done many detailed analyses on PGE-bearing sulfides and alloys (please see references 1-3). The use of a field emission electron microscope is very helpful in identification of fine intergrowths of PGM.

Indicator Minerals for Kimberlite and Diamond

Throughout the earth's history, starting at least 100 miles below the earth's surface, high temperature and pressure combined to transform carbon into diamonds mined today. The stones surfaced through volcanic activities leaving carrot-shaped pipes of rock called Kimberlites which are often decorated with diamonds and other gems.

We have done a significant amount of consulting work for diamond exploration and mining companies. The majority of the work has been to identify and quantify indicator minerals of Kimberlite and diamond by EPMA (electron probe analysis). The indicator minerals that are commonly used are pyrope (Mg (Al) rich garnet), Cr-diopside, chromite and ilmenite. Of the four, Cr-diopside and pyrope are the most abundant indicator minerals; pyrope and chromite are the heavier minerals and they have a better chance than Cr-diopside to survive from dispersion and alteration after they are carried onto or near the earth's surface.

you with that missing information

Pyrope is also commonly seen as mineral inclusions in diamond. They have been shown to be a "real" diamond indicator mineral. To simply describe garnet compositional categories the diamond exploration industry has been using the cluster-based nomenclature of Dawson and Stephens (1975): e.g. G10 is for Ca-undersaturated orthopyrope, while G9 represents Ca-saturated orthopyrope.

Garnet and other indicator minerals that are mantle derived provide one of the most practical approaches in diamond exploration. Their accurate compositional determination helps the diamond industry to do the work more efficiently and economically. Field emission electron microscopes can generate high magnification, high resolution images to help realize the study of fine grain diamond and its inclusions.

References (available upon request):

1. **Menghua Liu** and M.E. Fleet, 2001, Partitioning of siderophile elements (W, Mo, As, Ag, Ge, Ga, and Sn) and Si in the Fe-S system and their fractionation in iron meteorites. *Geochimica et Cosmochimica Acta*, 65, 671-682.
2. M.E. Fleet, **Menghua Liu** and J.H. Crockett, 1999, Partitioning of trace amounts of highly siderophile elements in the Fe-Ni-S system and their fractionation in nature, *Geochimica et Cosmochimica Acta*, 63, 2611-2622.
3. M.E. Fleet, J.H. Crockett, **Menghua Liu** and W.E. Stone, 1999, laboratory partitioning of platinum-group elements (PGE) and gold with application to magmatic sulfide - PGE deposits, *Lithos*, 47, 127-142.

THE COST OF ANALYSIS:

With our years of experience, fine equipment that is controlled by a state-of-the-art computer control system of our own design we provide you surprisingly cost efficient analyses. The cost of analysis is a product of cost/hour and the total number of hours. Many find our efficiency very high and that affects the total cost. Please contact us for a quotation. We look forward to hearing from you!

WHY USE GELLER MICROANALYTICAL?

We are always available, without obligation, for telephone consultation. Rush jobs can often be accomplished with overnight or next day service. Our reports can be emailed- at no extra cost. How can we do all this? Being a small company, we do not have the formalities, and we don't stand on ceremony. If we can fit an analysis in for you right away, we will. Our personalized service means you can discuss data directly with the analyst. Let us be your competitive advantage as so many others have done.

OUR PRODUCTS (PARTIAL LIST):

- "MRS" traceable stage micrometers and rulers (1X to 1,000,000X)
- Analytical standards- over 300 pure elements, alloys, glass, and minerals
- Ion beam sputtering standards
- Vacu-Storr© vacuum desiccators
- Computer control for SEM, EPMA and Auger

THE ELECTRON PROBE:

The physics of this instrument are the same as that for the SEM with EDAX. The difference is the x-rays are diffracted off crystals. This gives you up to 100X the sensitivity and spectral resolution, meaning almost no peak overlaps compared to EDAX.

Our instrument is a JEOL JXA-8600 with computer control systems, including digital imaging, of our own manufacture. The instrument has four wavelength dispersive x-ray spectrometers, each with multiple crystals. There is also an energy dispersive x-ray spectrometer which is used for qualitative analysis. The instrument is capable of detecting down to 10 PPM in micrometer sized areas. The computer control systems allows for unattended operation to allow large data sets to be collected.