

Uwe Richard Kackstaetter, Ph.D.

Associate Professor of Geology

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SPECIAL OFFER

FREE MINERAL SPECIMEN IDENTIFICATION

Participants will aid in the education of future Geoscientists!

The Department of Earth & Atmospheric Sciences Mineral Laboratory at the Metropolitan State University of Denver offers **FREE** non-destructive & destructive mineral identification services as part of their geoscientist training program and university community outreach. Samples will be assigned to students in Mineralogy & Optical Mineralogy during Fall & Spring semesters and analyzed under supervision by the instructing professor according to the clients specification. Clients will be presented with a full analytical report by the end of the semester and non-destructive tested specimens will be returned upon request (Please provide SASE or pick-up at the Earth Science laboratories at MSU Denver).

FREE SERVICES

NON DESTRUCTIVE TESTS

- Basic Mineral Identification:** Mineral will be laboratory tested for hardness¹, density, streak, magnetic & UV-response, radiation, possible optical properties & crystal habits and other as applicable and complete report compiled. *Note: While many minerals can be closely approximated with this test, some may NOT unambiguously distinguished without further testing. Destructive testing on a small sample chip is recommended for clarification. Call for details.*
- Nondestructive XRF** (X-ray fluorescence) semi quantitative chemical analysis. For heavier elements (“Fe” and up). Usually run automatically with the basic mineral identification request.
- COMING SOON! Scanning Electron Microscopy (SEM) & EDX analysis** (For this test we are asking for a \$35 tax-deductible donation to the MSU Denver Foundation for consumables & equipment maintenance): This test is very specific for identifying possible crystal habits in fine grained or granular specimens. Sample should be no larger than 1". SEM photomicrograph will be provided with report.

DESTRUCTIVE TESTS

- Basic Optical Analysis:** GRAIN MOUNT: A small sample fraction of finely powdered sample fragments will be used for optical grain mount analysis. REFRACTOMETER: Non-Destructive if sample has flat crystal faces. Both tests are specific for optical mineral properties and works for non-metallic minerals.
- X-ray diffraction (XRD) analysis** Most precise test for unambiguous mineral identification. Usually used for professional, industrial & research applications. Mineral will be powdered to a few microns and subjected to an x-ray beam. Resulting x-ray dispersive pattern is indicative of a specific mineral (almost like a fingerprint). Computerized database with over 3,700 minerals will be searched for closest match and the mineral will thus be exactly identified.
- ICP/AA wet chemical analysis and/or Additional Wet Chromatographic Analysis:** A small sample will be completely destroyed and digested in hot Aqua Regia acid. The solution will then be scanned for a suite of 40+ chemical elements with our ICP-MS. AAS is element specific investigation.

To submit samples or for further information contact Dr. Richard Kackstaetter as indicated above. All samples for identification should be received by first week in September or last week in January.

While not required, a suggested \$60 or less tax-deductible donation to the MSU Denver Earthscience Foundation for consumables & equipment maintenance would be highly appreciated.

¹Hardness testing may be slightly damaging to the specimen. While the test will be performed in an inconspicuous part of the sample, scratching may occur. It is best to include an inferior secondary sample of the same material for analysis.



Mineral Laboratory

DEPARTMENT of EARTH & ATMOSPHERIC SCIENCES

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MAIL SAMPLES WITH COMPLETED FORM TO:
Metro State University, Earth & Atmospheric Sciences
Minerals Lab; Attn: Dr. Kackstaetter
1201 5th Street
Denver, CO 80217

MINERAL IDENTIFICATION REQUEST FORM
 (Please attach to specimen! Use additional forms for each submitted specimen)

CLIENT INFORMATION (Please Print Clearly):

Last Name:	First Name, MI:	Date:
Address:	City:	State, ZIP
Phone:	Email:	

MINERAL SAMPLE INFORMATION & ANALYTICAL REQUEST (Please Print Clearly):

Short Mineral Description (what does the mineral look like you want identified; especially important for minerals in rock matrix):	
Where found (approx. location o.k.):	
Requested Laboratory Tests (Check all that apply) <i>Suggestion: For destructive sample testing, please submit additional secondary sample chips of same material</i> <input type="checkbox"/> BASIC MINERAL IDENTIFICATION incl. XRF - NON DESTRUCTIVE <input type="checkbox"/> ADD'L WET CHEMICAL QUALITATIVE ANALYSIS (ICP-MS / AAS / Chromatographic) - DESTRUCTIVE <input type="checkbox"/> OPTICAL TESTS: <input type="checkbox"/> Grain Mount - DESTRUCTIVE; <input type="checkbox"/> Refractometer -limited to suitable samples (NON DESTR.) <input type="checkbox"/> X-RAY DIFFRACTION ANALYSIS - DESTRUCTIVE <input type="checkbox"/> Coming soon! SCANNING ELECTRON MICROSCOPY - NON DESTRUCTIVE	
Comments: <input type="checkbox"/> Please Return Sample: <input type="checkbox"/> SASE included or <input type="checkbox"/> Will pick up. <input type="checkbox"/> Discard sample after analysis: <input type="checkbox"/> Just mail report or <input type="checkbox"/> Will pick up report	Voluntary Suggested Donation: <input type="checkbox"/> \$60 <input type="checkbox"/> \$30 <input type="checkbox"/> \$15 <input type="checkbox"/> \$8 <i>(Make Checks payable to MSU Denver Earth Science Foundation)</i>

By submitting the mineral sample for analysis I agree to following terms and condition: Neither Metropolitan State University of Denver, the Department of Earth & Atmospheric Science nor its affiliates, professors and students shall be liable for any loss or damage to submitted mineral samples nor for any damages, including but not limited to injuries, loss of property or profits, or incidental, consequential, exemplary, special or other damages written or implied, including any damages resulting from use of reported analytical results.

Do NOT write here! For internal use only:

Assigned Geoscientist:	Date Sample Received:
<input type="checkbox"/> Report completed and mailed/picked up: Date: _____	