

Curriculum Vitae

Rinat I. Gabitov

Department of Geosciences
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RESEARCH INTERESTS

Experimental mineralogy. Mineral growth and dissolution. Trace element (including actinides and lanthanides) and isotope geochemistry. Analytical geochemistry: SIMS, nano-SIMS, LA- ICP-MS, EMPA, atom probe tomography. Actinide chemistry. Carbon sequestration. Biomineralization. Paleoclimatology and chemical oceanography.

EDUCATION

Rensselaer Polytechnic Institute (RPI), Troy, NY 2002-2005

Ph.D. degree in Geology, Department of Earth and Environmental Sciences

Advisor: Bruce Watson

MS degree in Geology, Department of Earth and Environmental Sciences 2000-2002

Lomonosov Moscow State University, Moscow, Russia 1994-1999

BS degree in Geochemistry, Department of Geochemistry

Advisor: Dr. Yury Alekhin

PROFESSIONAL EXPERIENCE

Mississippi State University, Department of Geosciences

Assistant Professor of Geology 2013-present

Studying entrapment of actinides and lanthanides by environmentally important minerals at ambient and hydrothermal conditions through crystal growth experiments and analytical methods via ICP-MS, and LA-ICP-MS. Evaluating transport of Pt and Au in dry magmatic carbonic fluids. Evaluating mineral growth kinetics. Developing geochemical proxies by stable isotopes analyses of corals and foraminifera with SIMS and nano-SIMS.

University of California (UCLA), Department of Earth, Planetary, and Space Sciences

Staff Research Associate II 2012

Postdoctoral Scholar 2009-2012

Maintaining secondary ion mass spectrometer (SIMS, ims-1270), development of analytical methods, and leading projects on environmental applications.

California Institute of Technology (Caltech), Division of Geological and Planetary Sciences

Postdoctoral Scholar, 2006-2009

Assist in maintaining nanoSIMS (50L) and SIMS (ims-7f geo) and leading projects on biomineralization. Developing of standards for SIMS laboratory.

Woods Hole Oceanographic Institution, Department of Geology and Geophysics

Rensselaer Polytechnic Institute (dual appointment) 2005 -2006

Postdoctoral Fellow

Studying geochemistry of corals and inorganic carbonates with SIMS (ims-3f).

Rensselaer Polytechnic Institute, Department of Earth and Environmental Sciences 2000-2005

Research Assistant

Performing mineral solubility, crystals growth, and diffusion experiments for fluorides, carbonates, and silicates. Using scanning electron microscopy (SEM) and electron microprobe analyzer (EMPA).

Los Alamos National Laboratory, Los Alamos, NM

Visiting Scientist, EES-14

summers-2017,2018

Studying U (IV, VI) behaviour in hydrothermal carbonate and chloride bearing systems.

Summer Intern, MTS-8

2003

Preparing publication of Pu (IV, V, VI) speciations in brines.

Summer Intern, T-13

2001, 2002

Performing numerical simulation on Ca and F diffusion in silicate melts.

Institute of Experimental Mineralogy, Chernogolovka, Russia

Intern

1999-2000

Performing experiments on fluorite solubility in granitic melts.

Summer Intern

1997

Conducting electrochemical studies on the charge of iron oxide colloids

Moscow State University, Moscow, Russia

Intern

1996 -1999

Performing experiments on fluorite solubility in aqueous solutions and water vapour.

Conducting thermodynamic calculations.

FELLOWSHIPS

NSF – CRDF Global Visiting Scholar Fellowship at King Abdullah University of Science and Technology (\$47,000 plus research expenses)

2016

GRANTS

Awards:

NSF, C-DEBI (NSF Science and Technology Center for Dark Energy Biosphere), PI (\$2,500) 2014

NASA/MSSGC (Mississippi Space Grant Consortium, exploratory grant), PI (\$1,100) 2013

College of Arts & Sciences, MSU, Strategic Research Initiative, PI (\$7,250) 2018

Henry Family Research Fund, PI (\$4,900) 2017

Southeastern Conference Visiting Faculty Travel Grant Program, PI (\$1,250) 2016

Office of Research and Economic Development, MSU, PI (\$2,000/yr) 2014, 2016

2015 Schilling Special Teaching Projects Program, MSU, co-PI (\$2,850) 2015

UCMEXUS (University of California Institute for Mexico and US), 4443875RG69805, PI (\$1,500) 2012

UCMEXUS, postdoctoral grant (\$3,000) 2011

Awards for the use of analytical facilities:

Beam - time proposal at Diamond Light Source (UK), Case 140321, co-PI 2014

Instrumental time (NanoSIMS) at Johnson Space Center NASA 2014

Participation:

Norwegian Margin Fluid Systems and Methane-Derived Carbonate Crusts (NORCRUST) - Recent Scientific Advances in Service of Petroleum Exploration, Senior personnel 2016-2020

During graduate school and postdoctoral work:

NSF EAR nos.: 0073752, 0337481, 9804794, 0318137.

NSF OCE nos.: 0347328, 0402728, 0527350, 0823527, 0648157, 0929272.

WHOI Interdisciplinary Award no. 39040300.

DOE NNSA/DP and OBES Division of Chemical Sciences under Contract W-7405.

NOAA - MIT Sea grant Program: NA100AR4170086.

GRADUATE STUDENTS

PhD students:

Anh Nguyen (MSU)	2018-present
Angel Jimenez (MSU)	2018-present
Timothy Palmer (MSU)	2018-present
Brittany Garner (MSU)	graduated 2017
Jeremy Weremeichik (MSU)	graduated 2016
John Paul Jones (MSU)	graduated 2014

MS students:

Noah Van Hartesveldt	2018-present
Anh Nguyen (MSU)	graduated 2018
Timothy Palmer (MSU)	graduated 2018
Jonney Mitchell (MSU)	graduated 2016
Aleksandra Novak (MSU)	graduated 2016
Trung Nguyen (UCLA, co-advising)	2010-2012

TEACHING EXPERIENCE

<u>Instructor: Survey Earth Sci I (1113), MSU</u>	2013-present
<u>Instructor: Mineralogy (4114/6114), MSU</u>	2013-present
<u>Instructor: Petrology (4123/6123), MSU</u>	2013-present
<u>Instructor: Introduction to Geochemistry (GG 4633/6633), MSU</u>	2017-present
<u>Instructor: Hydrology (8613, Distance Learning), MSU</u>	2016
<u>Instructor: Rocks and Minerals (8133, Distance Learning), MSU</u>	2014, 2016
<u>Instructor: Topics in Geochemistry (8990), MSU</u>	2015, 2018
<u>Instructor: Earthquakes (ESS 008), UCLA</u>	2012

Guest lecturer for graduate level course: Principles and applications of proxies in paleoclimate and geobiology, UCLA

2012

Lecturer at SIMS Student Workshop (graduate level), UCLA

2010-2012

Training students and visitors, Caltech and UCLA

2006-2012

Teaching Assistant, Rensselaer Polytechnic Institute, Troy, NY

2002-2004

VISITING POSITIONS

Visiting Scientist, Los Alamos National Laboratory, Division of Earth and Environmental, Sciences, EES-14, Los Alamos, NM	summers 2017, 2018
Visiting Scientist, Rensselaer Polytechnic Institute, Troy, NY, USA	2014, 2015
Researcher, Institute of Experimental Mineralogy, Chernogolovka, Russia	2000-2006

REVIEWER

Grants

United States-Israel Binational Science Foundation (BSF) (2017)
European Research Council (ERC), Earth System Science Panel (2016)
NSF-OCE (Chemical Oceanography 2011, Marine Geology and Geophysics 2014, 2015)
NSF-EAR (Geobiology and Low-Temperature Geochemistry 2009, 2016)
Russian Ministry of Science and Education (2013)

Journals

Earth-Science Reviews, ACS Earth and Space Chemistry, Geochimica et Cosmochimica Acta, Earth and Planetary Sciences, Biogeosciences, American Mineralogist, Chemical Geology, Journal of Analytical Atomic Spectrometry, Minerals, Materials, Geochemistry Geophysics Geosystems.

PROFESSIONAL ACTIVITIES / SERVICE TO COMMUNITY

Certified Expert of Russian Academy of Sciences (ID 2016-01-4084-2849)	07/2016-present
Participant in round table discussion at the First Atom Probe Tomography Workshop for Earth Sciences (INVITED, University of Alabama)	01/2016
Represent MSU at Gem, Mineral, Fossil & Jewelry Show, Jackson, MS	2015-2018
Chair of the sessions at Goldschmidt Conferences (INVITED)	06/2014, 08/2018
Chair of the session at AGU	12/2011
Served as a judge for student presentations at AGU and EGU Meetings	12/2011, 4/2017

MEMBERSHIPS

American Geophysical Union, Geochemical Society, Geological Society of America, Paleontological Society (2014), Oceanography Society.

PUBLICATIONS

In preparation:

Gabitov R.I., Migdisov A., Van Hartesveldt N., Caporuscio F., Xu H., and Roback R.C. U⁴⁺ partitioning between calcite and fluid at hydrothermal conditions: An experimental study.

Gabitov R.I., Sadekov A., Dyer J., Perez-Huerta A., Xu H. Visualization of elemental uptake by individual calcite crystals.

Published:

Gabitov R.I., Sadekov A., Yapaskurt V., Borrelli C., Bychkov A., Sabourin K., and Perez-Huerta A. (2019) Elemental Uptake by Calcite Slowly Grown From Seawater Solution: An in-situ Study via Depth Profiling. *Front. Earth Sci.* 7:51. doi: 10.3389/feart.2019.00051

Gabitov R., Borrelli C., Buettner J., Kirkland B., Skarke A., Trail D., Garner B., Testa M., Wahidi M., Hoff C., Khasanov S., Panieri G., Thirumalai R., Thomas J., Weremeichik J., Zverkova I. (2019) Characterization of Carbonate Crust from a Recently Discovered Methane Seep on the North Atlantic Continental Margin of the USA. *Minerals* 9, 138, <https://doi.org/10.3390/min9030138>

Simakin A.G., Salova T.P., **Gabitov R.I.**, Kogarko L.N., and Tyutyunnik O.A. (2019) Gold solubility in reduced carbon-bearing fluid. *Geochemistry International* 57, 400–406

Allen P.J., DeVries R.J., Fox D.A., **Gabitov R.I.**, Anderson W.G. (2018) Trace element and strontium isotopic analysis of Gulf Sturgeon fin rays to assess habitat use. *Environmental Biology of Fishes* 101, 469. <https://doi.org/10.1007/s10641-018-0713-7>

Gabitov R.I., Sadekov A., and Migdisov A. (2017) REE incorporation into calcite individual crystals as one time spike addition. *Minerals* (INVITED) 7(11), 204; doi:10.3390/min7110204

Sturrock C.P., Catlos E.J., Miller N.R., Fall A., Larson T., **Gabitov R.I.**, Akgun A., and Yilmaz I.O. (2017) Fluids along the North Anatolian Fault, Nixsar Basin, north central Turkey: Insight from stable isotopic and geochemical analysis of calcite veins. *Journal of Structural Geology*, 101, 58-79, <http://dx.doi.org/10.1016/j.jsg.2017.06.004>.

Saenger C., **Gabitov R.I.**, Farmer J., Watkins J., Stone R. (2017) Linear correlations in bamboo coral $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ sampled by SIMS and micromill: evaluating paleoceanographic potential and biomineralization mechanisms using $\delta^{11}\text{B}$ and Δ^{47} variability. *Chemical Geology* (INVITED), 454, 1-14, <http://dx.doi.org/10.1016/j.chemgeo.2017.02.014>.

Weremeichik J.M., **Gabitov R.I.**, Thien B., and Sadekov A. (2017) The effect of growth rate on uranium partitioning between individual calcite crystals and fluid. *Chemical Geology*, 450, 145–153, <http://dx.doi.org/10.1016/j.chemgeo.2016.12.026>.

Simakin A.G., Salova T.P., **Gabitov R.I.**, and Isaenko S.I. (2016) Dry CO₂-CO fluid as an important potential Deep Earth solvent. *Geofluids*, 16, 1043–1057, doi:10.1111/gfl.12204.

Peacock E., **Gabitov R.I.**, Frisch J., Carlock B., Henderson K., and Hadden C. (2016) Archaeological Otolith Chemistry as a Tool for Seasonality and Site Catchment Studies: Some Preliminary Considerations. *Journal of Archaeological Sciences*, 65, 11–19.

- Jones J.P., Carricart-Ganivet J.P., Iglesias-Prieto R., Enríquez S., Ackerson M., and **Gabitov R.I.** (2015) Microstructural variation in oxygen isotopes and elemental calcium ratios in the coral skeleton of *Orbicella annularis*. *Chemical Geology* 419, 192-199.
- Gabitov R.I.**, Leinweber A., and Sadekov A. (2014) Crystal growth rate effect on Mg/Ca and Sr/Ca partitioning between calcite and fluid: An in situ approach. *Chemical Geology* 367, 70–82.
- Gabitov R.I.**, Rollion-Bard C., Tripathi A., and Sadekov A. (2014). *In situ* study of boron partitioning between calcite and fluid at different crystal growth rates. *Geochimica et Cosmochimica Acta* 137, 81–92.
- Gabitov R.I.**, Gagnon A.C., Guan Y., Eiler J.M, and Adkins J.F. (2013) Accurate Me/Ca ratio measurements in carbonates by SIMS and nanoSIMS and an assessment of heterogeneity in common carbonate standards. *Chemical Geology* 356, 94–108.
- Gabitov R.I.** (2013) Growth-rate induced disequilibrium of oxygen isotopes in aragonite: An in situ study. *Chemical Geology* 351, 268–275.
- Gabitov R.I.**, Watson E.B., and Sadekov A. (2012) Oxygen isotope fractionation between calcite and fluid as a function of growth rate and temperature: An in situ study. *Chemical Geology* 306-307, 92-102.
- Gabitov R.I.**, Schmitt A.K., Rosner M., McKeegan K.D., Gaetani G.A., Cohen A.L., Watson E.B., and Harrison T.M. (2011) In situ $\delta^7\text{Li}$, Li/Ca, and Mg/Ca analyses of synthetic aragonites. *Geochemistry Geophysics Geosystems* 12, Q03001, doi:10.1029/2010GC003322.
- Gabitov R.I.** (2010) Partitioning of Sr, Mg, U, $^{18}\text{O}/^{16}\text{O}$, and $^{13}\text{C}/^{12}\text{C}$ Between Calcium Carbonate Minerals and Fluid at Different Temperatures and Crystal Growth Rates. VDM Verlag Dr. Müller e.K., p.124.
- Holcomb M., Cohen A.L., **Gabitov R.I.**, and Hutter J.L. (2009) Compositional and morphological features of aragonite precipitated experimentally from seawater and biogenically by corals. *Geochimica et Cosmochimica Acta* 73, 4166–4179.
- Gabitov R.I.**, Gaetani G.A., Watson E.B., Cohen A.L., and Ehrlich H.L. (2008) Experimental determination of growth rate effect on U^{6+} and Mg^{2+} partitioning between aragonite and fluid at elevated U^{6+} concentration. *Geochimica et Cosmochimica Acta* 72, 4058–4068.
- Gabitov R.I.** and Watson E.B. (2006) Partitioning of strontium between calcite and fluid. *Geochemistry Geophysics Geosystems* 7, Q11004, doi:10.1029/2005GC001216.
- Ding M., Conca J.L., den Auwer C., **Gabitov R.I.**, Hess N.J., Paviet-Hartmann P., Palmer P.D., LoPresti V., and Conradson S.D. (2006) Chemical speciation of heterogeneously reduced Pu in synthetic brines. *Radiochimica Acta* 94, 249-259, DOI 10.1524/ract.2006.94.5.249.
- Gabitov R.I.**, Price J.D., and Watson E.B. (2005) Diffusion of Ca and F in haplogranitic melt from dissolving fluorite crystals at 900, 1000°C and 100 MPa. *Geochemistry Geophysics Geosystems* 6, doi: 10.1029/2004GC000832.
- Gabitov R.I.**, Price J.D., and Watson E.B. (2005) Solubility of fluorite in haplogranitic melt of variable alkalis and alumina content at 800-1000°C and 100 MPa. *Geochemistry Geophysics Geosystems* 6, doi: 10.1029/2004GC000870.
- Gabitov R.I.**, Price J.D., Gabitov I.R., and Watson E.B. (2001) The solubility of fluorite and diffusion of its components in haplogranitic melt at T=800, 900, 1000°C and P=100 MPa. *Los Alamos Preprint*, LAUR-01-6926, Los Alamos, New Mexico.

MEETINGS/ABSTRACTS

- Goldschmidt Conference (5 abstracts, co-author on 4), Boston, MA, USA 2018
- AGU Fall Meeting (2 abstracts, co-author on 1), New Orleans, LA, USA, 2017
- European Geological Union (EGU) Meeting (2 abstracts), Vienna, Austria 2017
- AGU Ocean Science Meeting (4 abstracts, co-author on 3), New Orleans, LA, USA, 2016
- AGU Fall Meeting(co-author), San Francisco, CA, USA, 2015
- GSA Annual Meeting (INVITED, co-author), Baltimore, MD, USA, 2015
- AGU Spring Meeting (co-author), Montreal, Canada, 2015
- 71st annual Southeastern Archaeological Conference (co-author, INVITED), Greenville, SC, USA, 2014
- Goldschmidt Conference (two abstracts, one is INVITED), Sacramento, CA, USA 2014
- Stable isotope Symposium (INVITED), Moscow, Russia, 2013
- EnvironMetal Isotopes Conference, Ascona, Switzerland, 2013

Goldschmidt Conference, Florence, Italy, 2013, *Mineralogical Magazine*, 77(5) 1126
AGU Fall Meeting, San Francisco, CA, USA, 2012, Abstract PP33A-2110
Goldschmidt Conference, Montreal, Canada, 2012, Abstract 2793
AGU Fall Meeting, San Francisco, CA, USA, 2011, Abstract PP41A-1743
Goldschmidt Conference, Prague, Czech Republic, 2011, Abstracts 2729 and 3053
Goldschmidt Conference, Knoxville, TN, USA 2010 (INVITED), *Geochim. Cosmochim. Acta*, 74, 12, A313
AGU Fall Meeting, San Francisco, CA, USA, 2009, Abstract V43J-09
11th Coral Reef symposium, 3 and 4, Fort Lauderdale, FL, USA, 2008
Goldschmidt Conference, Vancouver, Canada, 2008, *Geochim. Cosmochim. Acta*, 72, 12, A287
AGU Fall Meeting, San Francisco, CA, USA, 2007, Abstract B44C-02
AGU Fall Meeting, San Francisco, CA, USA, 2006, *Eos Trans. AGU*, 87(52), Abstracts: V32B-01 (INVITED), B13B-1076, B13B-1077, PP13C-07
Goldschmidt Conference, Melbourne, Australia, 2006, *Geochim. Cosmochim. Acta*, 70, 18, 187
Goldschmidt Conference, Moscow, ID, USA, 2005, *Geochim. Cosmochim. Acta*, 69, 10, A777
AGU Fall Meeting, San Francisco, CA, USA, 2004, *Eos Trans. AGU*, 85(47), Abstract B13E-05
AGU Spring Meeting, Montreal, Canada, 2004, *Eos Trans. AGU*, 85(17), Abstract V43A-05
Radiochemistry Conference 2003, Carlsbad, NM, USA
GSA Meeting, Boston, MA, USA, 2001, *Abstracts with Programs, GSA* 33, 6, A87
AGU Fall Meeting, San Francisco, CA, USA, 1999, *Eos, Trans., AGU* 80, 46, 1165.

COLLOQUIA

Texas A&M University, USA	01/2014
Mississippi State University, USA	07/2012
Ruhr University Bochum, Germany	05/2012
University of Southern Mississippi, USA	03/2012
Institute of Marine Science, Rimouski, Canada	06/2011
University of Edinburgh, Edinburgh, UK	05/2009
University of California, Los Angeles, USA	04/2009
University of Joseph Fourier, Grenoble, France	03/2009
University of Houston, Houston, USA	04/2008
Institute of Experimental Mineralogy, Chernogolovka, Russia	06/2001

SEMINARS

University of Mississippi, USA	02/2017
University of Alabama, USA	03/2016
University of Cambridge, UK	12/2014
Mississippi State University, USA	03,08,09/2013
P.P. Shirsov Institute of Oceanology, Russian Academy of Science, Russia	08/2013
National Academy of Science of the Kyrgyz Republic, Kyrgyzstan	08/2013
University of California, Los Angeles, USA	11/2012, 05/2011
National Museum of Natural History, Paris, France	03/2009
University of Southern California, Los Angeles, USA	01/2009
California Institute of Technology, Pasadena, USA	03/2007
Woods Hole Oceanographic Institution, Woods Hole, USA	02/2006, 10/2004
Institute of Experimental Mineralogy, Chernogolovka, Russia	06/2005
Los Alamos National Laboratory, Los Alamos, USA	07/2002
Rensselaer Polytechnic Institute, Troy, USA	11/2001
Moscow State University, Moscow, Russia	05/1997-05/1999

COLLABORATORS

Ackerson, Michael (Rensselaer Polytechnic Institute); den Auwer, Christophe (CEA Marcoule, France); Borrelli, Chiara (University of Rochester); Carricart-Ganivet Juan P. (National Autonomous University of Mexico); Catlos, Elizabeth (The University of Texas at Austin); Conca, James (Institute for Energy and the Environment at New Mexico); Conradson, Steven (Los Alamos National Laboratory); Ding, May (Los Alamos National Laboratory); Eagle, Robert (University of California Los Angeles); Ehrlich, Henry (Rensselaer Polytechnic Institute); Enríquez, Susana (National Autonomous University of Mexico); Gagnon, Alexander (University of Washington); Hess, Nancy (Pacific Northwest National Laboratory); Holcomb, Michael (University of Western Australia); Leinweber, Anita (UCLA); LoPresti, Vin (Los Alamos National Laboratory); Messenger, Scott (JSC); Nguyen, Ann (NASA); Palmer, Phillip (Los Alamos National Laboratory); Panieri, Giuliana (The Arctic University of Norway); Paviet-Hartmann, Patricia (Pacific Northwest National Laboratory); Price, Jonathan (Midwestern State University); Prieto, Roberto Iglesias (National Autonomous University of Mexico); Rogers, Karyn (Rensselaer Polytechnic Institute); Rollion-Bard, Claire (Centre de Recherches Pétrographiques et Géochimiques, France); Rosner, Martin (Federal Institute of Materials and Testing, Germany); Sadekov, Aleksey (The University of Cambridge, UK); Schmitt, Axel (University of California Los Angeles); Tripathi, Aradhna (University of California Los Angeles).

MEDIA COVERAGE

'Virtual' dissection may crack secrets of dino eggs. Mississippi State University News, July 22, 2014
(<http://www.wcbi.com/local-news/virtual-dissection-may-crack-secrets-of-dino-eggs/>)