

Meet the Authors



Michael Anenburg is an experimental petrologist. He is an Australian Research Council Linkage post-doctoral fellow at the Australian National University, after obtaining his PhD at the same place. Michael's interests include the thermodynamics, petrology, and geochemistry of rare earth elements, carbonates, and other exotic terrestrial melts; platinum group elements; and various topics in igneous and hydrothermal petrology. By using experimental petrology methods, he is developing petrological and geochemical tools for porphyry copper and gold exploration. Michael occasionally dabbles in the materials chemistry aspects of experimental and natural geological minerals.



Sam Broom-Fendley is a NERC Industrial Innovation independent research fellow at the Camborne School of Mines (University of Exeter, UK), where he gained his PhD in 2015. His scientific interests centre on understanding how mineral deposits, especially those of the rare earth elements, form from carbonatites. To this end, he collaborates extensively with mineral exploration companies and combines field and petrographic observations with mineralogical and geochemical analyses to unravel both the large- and the small-scale processes that are responsible for mineralisation.



Wei Chen is an associate professor at the China University of Geosciences (Wuhan, China). She received her doctorate at the University of Notre Dame (Indiana, USA) in 2014. She is a geochemist by training, but also combines mineralogy and petrology. She is interested in the origin and evolution of carbonatite and associated mineral resources. She uses the state-of-the-art instruments, including laser ablation (MC)-ICP-MS to unravel the complex geological processes that are hidden in mineral grains at the microscopic scale. Wei Chen is also interested in developing new in situ elemental and isotopic analytical techniques.



Andrew G. Christy was Senior Curator of Minerals at the Queensland Museum and was Lecturer in Mineralogy at the University of Queensland from 2016 to 2019, after having a career that included studies on high-pressure phase transitions, short-range order in crystal structures, ultra-high pressure metamorphism, magnetic carbon nanofoam, astrobiomineralogy, the causes of mineral diversity, and describing several new mineral species. Now self-employed as Christy Mineralogical Consulting, he offers his full interdisciplinary skill set across the sciences and arts for projects that require both breadth and depth. He has been Associate Editor of *Mineralogical Magazine* since 1998 and is the Australian representative on the Commission for New Minerals, Nomenclature and Classification since 2007.



Anna G. Doroshkevich has been working on carbonatites since her undergraduate studies in the Buryat State University (Russia) and did her PhD thesis on rare earth element (REE) carbonatites and alkali-silicate rocks from southern Siberia. Since 2016, she has been the head of the laboratory for alkaline magmatism and related ore-forming processes at the Sobolev Institute of Geology and Mineralogy (Novosibirsk, Russia). She is a renowned research leader in the fields of igneous petrology, mineralogy, geochemistry, and the isotopic geochemistry of alkaline-carbonatite complexes and associated REE and Nb ore deposits. Her numerous hobbies include pole dancing, rafting, mountain climbing, fishing, mushroom hunting, and reading.



Holly A. L. Elliott's research focuses primarily on ore deposits associated with magmatic, volcanic, and hydrothermal processes. She has investigated the relationship between diatreme volcanism and Pb-Zn mineralization in the 'Irish Ore Field' whilst at the University of Southampton (UK). Most recently, Holly has been investigating the feasibility of using fenitization as an exploration indicator for rare earth element deposits as part of the European Union-funded Horizon 2020 HiTech Alkcarb project, whilst employed at the Camborne School of Mines (University of Exeter, UK). Holly now continues her research as a lecturer of ore deposit geology in the Environmental Sciences department of the University of Derby (UK).



Emma R. Humphreys-Williams obtained her MSci from University of Durham (UK) and her PhD from the University of Bristol (UK) and currently runs the Chemical Laboratories at the Natural History Museum (UK). Apart from developing methods for the elemental analysis of natural science samples, her research focuses on the composition and evolution of the mantle source of carbonatites, with an interest in deciphering the geochemistry of primitive melts that form rapidly erupted carbonatites. She has recently created a digital version of Alan Woolley's catalogue of alkaline rocks and carbonatites (see www.alkcarb.com).



A. Lynton Jaques is an honorary Associate Professor at the Research School of Earth Sciences, Australian National University. He obtained his PhD in 1980 from the University of Tasmania (Australia) for studies in experimental petrology. Prior to retirement, he was Chief Scientist at Geoscience Australia, Australia's national geoscience research and information agency, holding a number of positions over his career. He researches the petrology of lamproites, kimberlites, and associated alkaline rocks, carbonatites, diamonds, and the structure, composition, and evolution of the lithospheric mantle.



Adrian P. Jones studies the mineralogy and petrology of alkaline igneous rocks that are rich in carbon, including mantle diamonds and impact diamonds. He runs the Haskel experimental laboratory at University College London (UK) to simulate the Earth's mantle where diamond may moderate carbon in melts and fluids. He promotes sustainability for subsurface resources, working with industry to address societal concerns about the environment. This includes carbon capture storage initiatives combined with subsurface energy operations, funded via the Horizon2020 European research programmes "S4CE" and "SXT". He is a strong supporter of developing multidisciplinary networks to empower emerging talents of early career researchers through national and international research programmes.



Vadim (Dima) S. Kamenetsky graduated from Moscow State University (Russia) in 1983 and earned his PhD from the Russian Academy of Sciences in 1991. He held several postdoc positions in France and Australia, and professorships in Germany and Australia. His petrological and geochemical studies on magmatic immiscibility are powered by the application of melt/fluid inclusion techniques and in-situ analytical methods. His studies of melt and fluid formation for a variety of ultramafic, basaltic, and felsic magmas in different tectonic environments is supplemented by research on related ore deposits, such as those at Olympic Dam (Australia) and Norilsk (Russia). He is most renowned for research on the primary melts of kimberlites and carbonatites.



Bruce A. Kjarsgaard obtained his BSc from the University of Guelph (Canada) and his PhD from Manchester University (UK), followed by post-doc positions in Manchester and at the Geological Survey of Canada. Bruce is a research scientist at the Geological Survey of Canada in Ottawa and an adjunct professor at the University of Alberta (Canada). His interest in carbonatites is fueled by relating results from experiments with petrology and economic geology studies. He also likes to integrate data for regional and global carbonatite data compilations.



Sergey V. Krivovichev is a Director General of the Kola Science Centre, Russian Academy of Sciences, which is located in the city of Apatity, few dozen kilometers away from the famous Kola mineral localities, including the Khibiny and Lovozero alkaline massifs. He is a full professor in the Department of Crystallography, Institute of Earth Sciences, St. Petersburg State University (Russia). In 2015–2016, he served as the President of the International Mineralogical Association and currently is the President of the Russian Mineralogical Society. His research interests include structural and descriptive mineralogy, inorganic crystal chemistry, crystallography, nuclear materials, and applications of complexity theory to natural and artificial objects.



Igor V. Pekov is Professor of Mineralogy at Lomonosov Moscow State University (Russia) and is a corresponding member of the Russian Academy of Sciences. He works on the mineralogy and geochemistry of alkaline rocks, the mineralogy and crystal chemistry of rare elements, the mineralogy of volcanic fumaroles and the oxidation zone of ore deposits, the crystal chemistry of zeolite-like materials, and researches the history of mineralogy. He is the senior author on 150 papers that report a new mineral species, a co-author on 120 other papers reporting new mineral species, and has had the great honour of having a new mineral named after him.



Anna V. Spivak has been working at the D.S. Korzhinskii Institute of Experimental Mineralogy, Russian Academy of Sciences, since 2001, after graduating from the Irkutsk State Technical University (Russia). In 2005, she defended her thesis “Growth, Properties and Morphology of Diamond Crystals from Carbonate Melts” at Moscow State University. In 2016, she defended her thesis “Genesis of Superdeep Diamond and Primary Inclusions in the Substance of the Earth’s Lower Mantle (Experimental Studies)” at Moscow State University and was awarded a Doctor of Science in Geology and Mineralogy. Anna Spivak’s scientific interests are focused on studying mantle systems and the physico-chemical conditions of diamond formation.



Suzette Timmerman is a Banting post-doctoral fellow at the University of Alberta (Canada). She obtained her PhD at the Australian National University for her work on helium isotope compositions of the transition zone and on sub-continental lithospheric mantle through time using diamond samples. Her interests include volatile recycling, the influence of recycled material on the composition of the mantle through time, diamond formation, and craton formation and evolution. Her current research is on tracking the Earth’s deep carbon cycle through dating of superdeep mineral inclusions and stable isotope analyses.



Gregory M. Yaxley is Professor of Experimental Petrology at the Australian National University (ANU). Greg obtained his BSc (Hons) and PhD from the University of Tasmania (Australia). He held a postdoctoral fellowship at the Australian National University and held an Alexander von Humboldt Fellowship at the Goethe University (Germany) before joining the faculty at the Research School of Earth Sciences at ANU. He was awarded a Marie-Curie International Incoming Fellowship at Bristol University (UK) in 2015. His research interests include high-pressure experimental and natural sample investigations of Earth’s deep volatile cycles.



Sabin Zahirovic is a researcher and lecturer at the University of Sydney (Australia), with a research focus on plate tectonics, geodynamics, and paleogeography. He received his PhD in 2015 and has been using the open-source and cross-platform GPlates software (www.gplates.org) to build regional and global digital plate tectonic reconstructions. This digital community infrastructure has enabled Sabin and others to study the plate–mantle system, the role of the deep Earth in driving surface geography, as well as the mantle and tectonic perturbations to the planetary “deep” carbon cycle.



Anatoly N. Zaitsev is Professor of Mineralogy at St. Petersburg State University (Russia) and Scientific Associate at the Natural History Museum (London, UK). He has researched the mineralogy of carbonatites, of phoscorites, and of alkaline rocks from the Kola Peninsula (Russia) and the Gregory Rift (Tanzania). Recently, he started work on Tanzania’s Laetoli tuffs, their 3.66 Ma *Australopithecus afarensis* footprints, and the spatially associated basaltic rocks, including those from Ngorongoro (Tanzania). He has been awarded prestigious Alexander von Humboldt, Marie Curie and Fulbright fellowships. The mineral $\text{REE}_4\text{Fe}^{2+}\text{Ti}_6\text{O}_{18}(\text{OH})_2$ was named after him (anzaitite-Ce) in recognition of his contribution to the study of REE minerals.

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