

## Presentation of the Dana Medal of the Mineralogical Society of America for 2018 to Jörg Hermann

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It is my pleasure to introduce Jörg Hermann, the 2018 Mineralogical Society of America Dana Medalist; I am supported in this endeavor by Marc Hirschmann of the University of Minnesota, Ian Buick of Stellenbosch University, David Green of the University of Tasmania, and Hugh O'Neill of Australian National University.

I first started to read Jörg's papers simply because he and I have considerable overlap in our interests, but I quickly discovered that Jörg's papers must be read if one is to understand the frontier of knowledge in mineralogy, petrology, and geochronology. Jörg's work is marked by the selection of important scientific problems, excellent experimental methodology, thorough execution, peerless data analysis, and insightful speculation on future research directions. These are the hallmarks of a great scientist. There is no doubt in my mind that Jörg stands among the pantheon of *great* mid-career mineralogists.

Jörg began his career at ETH, where he earned a Silver Medal for his Diploma research, and he published six papers before his Ph.D. thesis was finished in 1996. Four years later, Jörg was awarded the Paul Niggli Medal by the Swiss Academy of Science. Then, he moved to ANU where he significantly expanded his focus from field studies to include experimental work. It was at ANU that Jörg—often working in concert with Daniela Rubatto—exploded in productivity to become a dominant force in mineralogy, petrology, and geochronology. I want to highlight three major areas where Jörg and colleagues have made important contributions.

**First, accessory mineral petrochronology.** Jörg has been a pioneer in petrochronology: the marriage of grain-scale chemistry and chronology to tie dates to specific *P-T* conditions or mineral assemblages. He was the first to use REE signatures of zircon to determine the exhumation rate of UHP rocks, the first to show the potential of titanite as a petrochronometer, and among the first to use monazite as a petrochronometer, penning the seminal paper on monazite–garnet REE partitioning.

**Second, experimental petrology of continental crust.** With the discovery of UHP rocks in most well-studied Phanerozoic orogenic belts, understanding the phase relations of continental crust at 3+ GPa became imperative, and Jörg almost single-handedly filled this void with a series of thorough experimental studies on natural rocks and chemically simplified

systems. One of the most important questions regarding the subduction of continental crust is whether the quartzofeldspathic rocks that comprise the bulk of continental crust transform to UHP minerals and then react back to low-pressure minerals; related to this is the question of how continental crust deforms during subduction. Jörg addressed the phase-transformation issue, finding that the preservation of the UHP mineral assemblage hinges on whether phengite breaks down during exhumation and releases H<sub>2</sub>O that catalyzes a reaction. He then showed that the UHP Dora Maira massif reached not just coesite-stable conditions, but the diamond stability field—a result not previously imagined, but subsequently shown to be presciently correct. He and Carl Spandler quantified the solubility of Na and P in garnet and debunked the notion of 6 GPa pressures in the Rhodope UHP massif. Together, with Aleks Stepanov, he showed in Kokchetav that rocks metamorphosed at 5 GPa and 1000 °C were mixed with colder rocks at much lower pressure, forming a true subduction mélange. And I very much like the Ganade de Araujo et al. paper tracing out a 2500 km long UHP–HP Ediacaran orogen.

**Third, and finally, the role of accessory phases in trace-element cycling.** Both petrochronology and the origin of arc magmatism—two quite disparate things—hinge on the partitioning of trace elements among different phases. In a wonderful, ground-breaking series of papers, Jörg and colleagues quantified the partitioning of trace elements as a function of *P* and *T*, defining the conditions and ways under which trace elements are lost and gained from rocks, melts, and fluids. They have built an important and very widely used dataset of great interest geochronologists and to igneous and metamorphic petrologists interested in subduction zones, mantle wedges, and arc magmatism.

In summary, Jörg Hermann is an exceptionally productive mid-career scientist who has forged a brilliantly successful path in mineralogy and petrology by combining observational studies of natural rocks with experiments and cutting-edge analytical techniques to push the frontier of our understanding. Jörg's breadth, depth, and creativity of approach, combined with a widely recognized ability to communicate in writing and in person, showcase Jörg as an example to younger scientists of what it takes to be great and win the Dana Medal. It is my honor to present to you the 2018 Dana Medalist, Jörg Hermann.