



# Mineralogical Association of Canada

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## MAC-SPONSORED SPECIAL SESSIONS

The Mineralogical Association of Canada (MAC) sponsored several special sessions at the Joint Assembly meeting in Toronto, Canada, in May 2009. Here are summaries of three of them.

### *Tourmaline: An Ideal Indicator of Its Host Environment*

Tourmaline-group minerals are ubiquitous accessory minerals in the Earth's crust. They can adjust their composition to suit a wide variety of environments and therefore display a remarkable range in stability in terms of pressure, temperature, and chemical environment. Because of this compositional sensitivity, tourmaline is an excellent indicator of the environmental conditions in its host. This is enhanced by the fact that tourmaline shows negligible diffusion up to remarkably high temperatures and a strongly refractory character during subsequent host-rock alteration and weathering, as well as mechanical transport of grains. Whereas most prior tourmaline research focused on chemical and crystallographic characterization and the systematics of the tourmaline-group minerals, recent studies are oriented towards a quantitative reconstruction of host environmental conditions using a combination of tourmaline structural, compositional, and crystallographic characteristics. This special session highlighted these exciting advances and considered the obstacles to be overcome.

In his keynote talk, David London (University of Oklahoma) gave an overview of the experimental work on tourmaline and established the important constraints this research places on the formation of natural tourmaline. Of particular interest was his observation that the speciation of elements in the melt has a strong control on subsequent tourmaline composition. Similarly, a proper understanding of coupled substitution mechanisms is crucial to the interpretation of compositional variations, as highlighted in presentations on the intimate links between crystal structure and composition by Ferdinando Bosi and Aaron Lussier. If tourmaline compositions are to be used properly, the constraints imposed by crystallography must be understood, and the presentations by Ferdinando Bosi and Christine Clark addressed this concern. Tourmaline has an impressive stability range, from diagenetic conditions to well into the eclogite and granulite facies. Different generations of tourmaline, as well as compositionally zoned grains, can record and preserve this complete history, and talks by Darrell Henry and Vincent van Hinsberg showed how information on pressure, temperature, and composition can be extracted from these grains. The poster session, with presentations by Kristen Longfellow, Maria Sokolov, and Eva Wadoski, highlighted how tourmaline texture and composition reveal information on the pressure, temperature, and chemical evolution of their host rocks.

The main conclusion of the session was that we are standing on the brink of a major breakthrough in the use of tourmaline as a quantitative indicator of the chemical and physical properties of its host environment and that these advances may well make tourmaline the prime mineral for this purpose in the future. This exciting prospect will be explored further in an upcoming thematic issue of *The Canadian Mineralogist*, expected to appear in 2010.

**Vincent van Hinsberg** (McGill University),  
**Darrell Henry** (Louisiana State University),  
and **Horst Marschall** (University of Bristol)

### *Carbonate-Hosted Ore Deposits*

The session was held in honor of Frank Beales (1919–2004), who made many fundamental contributions to the understanding of Mississippi Valley Type deposits and their host rocks in the 1960s. The presentations addressed the genesis of carbonate-hosted deposits from Australia,

Spain, Ireland, China, Zambia, Indonesia, and Honduras, as well as deposits from the Canadian Arctic, the Mackenzie Mountains, and the Maritimes. Along with the Mississippi Valley and Irish-type deposits, the formation of higher-temperature Zn–Pb–Ag skarns and Zn oxide deposits was also discussed, emphasizing some of the common processes involved in the formation of base metal deposits in carbonate rocks at a range of pressure and temperature conditions. The final talk of the oral session was given by a long-time friend and colleague of Frank Beales, Professor Greg Anderson of the University of Toronto, who aptly reminded all present that it all comes down to thermodynamics in the end!

**Sarah Gleeson** (University of Alberta)

### *Recent Advances in Trace Element and Isotopic Microanalysis of Accessory Minerals*

MAC cosponsored this special session in conjunction with the Volcanology, Geochemistry, and Petrology Division of the AGU. The session was spread out over two days, and 14 oral and 5 poster presentations were given. A wide variety of topics were presented on the trace elements or isotopes of sulfide, silicate, oxide, and phosphate minerals from magmatic and hydrothermal environments. MAC sponsored Jacob Hanley from St. Mary's University (Halifax), who (with coauthor M.K. MacKenzie) talked on the subject "Incorporation of Platinum-Group Elements and Cobalt into Subsidiary Pyrite in Alkalic Cu-Au Porphyry Deposits: Significant Implications for Precious Metal Distribution in Felsic Magmatic-Hydrothermal Systems." An invited talk given by J.R. Clark of McGill University (with A.E. Williams-Jones) was on the subject "Compositional Variability of Rutile in Hydrothermal Ore Deposits." A second invited talk, by S.-J. Barnes of Université du Québec à Chicoutimi (with S.A. Dare) was entitled "Contrasting Platinum-Group Element and Chalcophile Element Contents in Pyrrhotite, Pentlandite, and Chalcopyrite from Different Environments."

**Robert Linnen** (University of Waterloo)

## \$5000

## Scholarships

**The Mineralogical Association of Canada Foundation**

will award two \$5000 scholarships to graduate students, one to a student enrolled in an MSc program and one to a student in a PhD program. The applicable fields of study are:

- Mineralogy
- Crystallography
- Geochemistry
- Mineral Deposits
- Petrology

**Deadline to apply:**  
**May 1<sup>st</sup>, 2010**

**Eligibility**

① Students entering the second year of an MSc program or the second or third year of a PhD program at a Canadian university in September 2010.

② Canadian citizens enrolled in the above or equivalent programs at any university.

For more information, contact:

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Application form available at  
[www.mineralogicalassociation.ca](http://www.mineralogicalassociation.ca)

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