THE HAWLEY MEDAL FOR 1999 TO ALAN J. ANDERSON, ROBERT A. MAYANOVICH AND SAŠA BAJT

Ladies and Gentlemen,

The recipients of the Hawley Medal for 1999, awarded for the best paper published in *The Canadian Mineralogist* in 1998, are Alan J. Anderson of St. Francis Xavier University, Robert A. Mayanovich of Southwest Missouri State University, and Saša Bajt of the University of Chicago. Their paper, entitled "A microbeam XAFS study of aqueous chlorozinc complexing to 430°C in fluid inclusions from the Knaumühle granitic pegmatite, Saxonian Granulite Massif, Germany", appears in volume **36**, pages 511-524. The paper was selected by the Hawley committee for its innovation in approach to the study and interpretation of fluid inclusions and its influence in opening up new areas of research and for its application of synchrotron radiation. This is indeed an appropriate choice, given the recent Canadian Foundation for Innovation award to the Canadian Light Source facility in Saskatoon, to be completed by 2003. Alan and colleagues have been pioneers in the application of synchrotron radiation to mineralogical research. Papers such as this year's Hawley winner demonstrate the potential of the technique to complement our existing toolbox for research on solids, liquids and gases. It also gives me great pleasure to present the Hawley award to a person employed at a small university. The enthusiasm and diligence of scientists employed in small universities are often not recognized by granting councils and agencies. Excellent research depends on the excellence of the scientists, not their place of employment.

James Nicholls
President, MAC

It is an honor to be in Sudbury today to accept the prestigious Hawley medal for our paper on chlorozinc complexing in high-salinity fluid inclusions. Robert Mayanovic, Saša Bajt and I would like to thank the Mineralogical Association of Canada for this important accolade. I am exceptionally pleased that this paper was published in a special issue honoring my friend and mentor, Petr Černý, and an esteemed colleague, the late Eugene Foord.

Our paper represents the first attempt to examine the structure of aqueous metallic complexes in natural fluid inclusions at elevated temperatures and pressures using X-ray absorption spectroscopy. This research was inspired, in large part, by a paper that appeared in a 1985 issue of *The Canadian Mineralogist* entitled "Chemical controls on solubility of ore-forming minerals in hydrothermal solutions" by the late David Crerar and co-investigators. Their paper articulated the need to resolve the molecular properties of aqueous metallic species in order to understand the fundamentals controls of ore transport and deposition in hydrothermal systems. We hope that our application of micro-XAFS to ore-forming brines in fluid inclusions has in some way contributed to the goals advanced by Crerar and his colleagues.

Fluid inclusions are tiny bottles of ancient fluids and as such can provide a wealth of information on the geochemistry of a given hydrothermal system. A significant challenge, however, is answering the question: Are these inclusion fluids fully representative of the original entrapped fluids? In spite of the possible pitfalls and uncertainties, it is important that we pay careful attention to what nature has provided and, where possible, use fluid-inclusion data together with theory and experiment to formulate better models of hydrothermal ore deposition.

We would like to acknowledge the important role of several people who made this work possible. We are greatly indebted to I-Ming Chou of the U.S. Geological Survey, Reston, Virginia, for experimentally re-equilibrating some fluid inclusions at high hydrogen pressures. Rainer Thomas of the GFZ, Potsdam, Germany, is thanked for openly sharing his knowledge on the gra-

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nitic pegmatites in the Granulite Massif, providing laser Raman analyses on some of the fluid inclusions, and for introducing Robert and me to some fine German beers. Our experiments could not have been done without the use of the X-ray microprobe, X26A, at the National Synchrotron Light Source at the Brookhaven National Laboratory, New York. Mark Rivers, Steve Sutton and Grace Shea McCarthy deserve credit for the development and maintenance of this instrument, which was state-of-the-art at the time of our experiments. The National Synchrotron Light Source is thanked for generously providing enough beam time to allow us to learn from our mistakes and get it right the next time. I am happy to report that a third-generation synchrotron light source will be constructed in Saskatoon. This facility will open many new opportunities for mineralogists, petrologists and environmental geoscientists to study their materials. It is important that we as a group plan for a beamline that will serve our needs.

I thank NSERC for providing the funds needed to conduct this research, and for recognizing that innovative science is being done by researchers at small universities. My colleagues at St. Francis Xavier University, particularly Brendan Murphy and Sid Taylor, willingly absorbed some of my departmental responsibilities whenever I disappeared to a synchrotron laboratory in the United States. The members of my department are thanked for making St.F.X. a great place to work. Finally, I would like to thank my wife, Deborah, and my daughters Alexandra, Victoria and Virginia, for their love and patience.

Our paper was a team effort, and I am certain that the project would have failed if any one of us did not take part. Our collaboration yielded some exciting discoveries and numerous stimulating scientific discussions, but I feel that the greatest reward was the humor and friendship that we shared. In conclusion, we are very pleased and honored to accept this award, and I thank you very much.

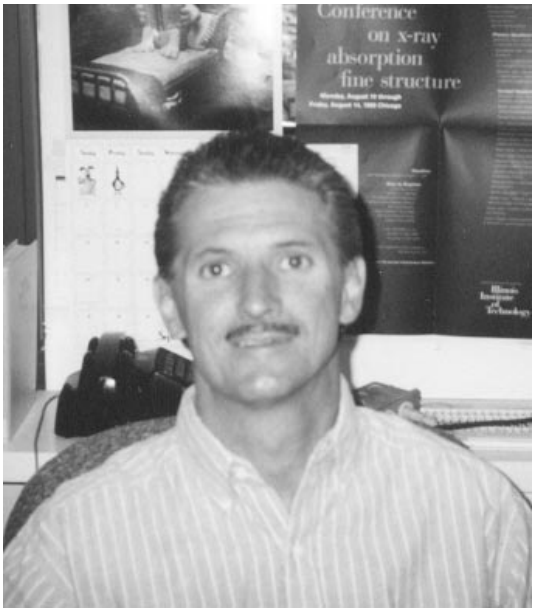
Alan J. Anderson
St. Francis Xavier University

I would like to thank the Hawley Award Committee for their recognition of our work. The quality of the work published every year in *The Canadian Mineralogist* is quite impressive, which no doubt must have made the committee's selection process for 1998 a formidable task. Numerous papers published previously in *The Canadian Mineralogist*, most notably papers by David Crerar and by his coworkers, were exceedingly useful in laying the groundwork for our synchrotron microprobe work on fluid inclusions. These publications communicated very important conclusions and, perhaps more importantly, posed some crucial fundamental questions regarding the nature of transport of metal ions in hydrothermal fluids and of deposition of ore minerals in the lithosphere.

I would also like to acknowledge St. Francis Xavier University, for granting me the James Chair Fellowship, and the Department of Geology for their hospitality while visiting there during the summer of 1995. It was during this time that Alan and I were able to work closely on the implementation of our project on fluid inclusions under elevated pressure and temperature conditions, and resolve many issues of our work. I thank my colleagues at Southwest Missouri State University for their support during the course of this project.

It has been a joy to work with Saša and Alan on this project. Saša brought much needed expertise in use of the synchrotron microprobe and donated some of her own valuable beam time to this project. I would especially like to thank Alan for introducing me to this area of investigation in fundamental geochemistry, which I think is poised for dramatic growth, partially on account of the development of synchrotron and other analytical techniques. Alan's interest in ore-forming systems is both inspirational and contagious. It is he, above all, who needs to be recognized for planting the seed of an idea, from which this project grew. In conclusion, it gives me great pleasure to accept this award. Thank you!

Robert A. Mayanovic
Southwest Missouri State University



ROBERT A. MAYANOVICH

It was my pleasure to be invited to work with Alan and Robert on this interesting and challenging project, and I was overjoyed to hear that the Mineralogical Association of Canada honored us with the Hawley Medal for our paper.

I would like to use this opportunity to thank Steve Sutton and Mark Rivers, who introduced me to the art of the synchrotron X-ray fluorescence microscopy and spectroscopy, and Professor Joseph V. Smith and the University of Chicago, for giving me the opportunity to work in such a stimulating environment. During the time spent at the National Synchrotron Light Source, I had the privilege to meet many scientists and start fruitful collaborations, most of them on problems in mineralogy and geology. The research on fluid inclusions that led to the awarded paper was based on a team effort. Each one of us brought his or her unique expertise that proved to be complementary and that helped us to attack the problem from a new perspective. Our collaboration led not only to exciting science but also to lasting friendships.

I feel honored to share this award with Alan and Robert, and would like to thank again the Mineralogical Association of Canada for this prestigious recognition.

SAŠA Bajt
Lawrence Livermore National Laboratory

SAŠA BAJT