



## **GEORGE B. MORGAN VI**

### **Present Position**

**Scientific Researcher II, Electron Microprobe Laboratory**, University of Oklahoma (05/17/92-present): duties include operation, maintenance, management of facilities, and user training for a Cameca SX50 electron microprobe (see: <http://research.ou.edu/microprobe/ouemplhome.asp>).

**Adjunct Associate Professor**, School of Geology and Geophysics University of Oklahoma (08/23/99-present).

### **Research Interests:**

Igneous petrology, experimental geochemistry, materials science, electron microscopy, vibrational spectroscopy.

### **Education**

Ph.D. in Geology (December, 1988), “Igneous and Metamorphic Geochemistry of Boron”, University of Oklahoma, Norman.

M.S. in Geology (December, 1986), “Alteration of Amphibolitic Wallrocks Around the Tanco Rare-Element Pegmatite, Manitoba”, University of Oklahoma, Norman.

B.A. in Music Performance (May, 1984), University of Nevada, Las Vegas

B.S. in Geology (December, 1983), University of Nevada, Las Vegas

### **Post-Doctoral Experience**

Teaching of Graduate course, Electron Microbeam Techniques in Earth and Materials Science: summer, 1998; fall 1998; fall 1999; fall 2001; fall 2003.

Teaching of Graduate course: Digital Image Analysis: Fall 2000.

Service on advisory committee for Ph.D. student (Joey Evensen, 05/98-09/01), and M.S. student (Eric Fritz, 09/00-12/01), University of Oklahoma.

Consultant to UroCor, Inc. (820 Research Parkway, Oklahoma City, OK 73104): 10/95-present. Creation and development of a laboratory for clinical analysis of urinary calculi (kidney and bladder stones, renal papillae) by polarized light microscopy and FTIR spectroscopy; training and performance assessment of technicians; imaging and analysis of problematic specimens by electron microscopy and energy-dispersive x-ray analysis.

Technical Scientist, Raman spectroscopy specialist, Dept. of Earth and Planetary Sciences, Washington University, St. Louis, MO (Jill D. Pasteris, Faculty Supervisor): 1/15/90-5/17/92. Operation and maintenance of single- (JY U1000) and multi-channel (JY S3000) microsampling Raman spectrometers; research on natural and synthetic fluids.

Research Associate, School of Geology and Geophysics, University of Oklahoma, under National Science Foundation Grant “Principals of Lithophile Element Concentration in Silicic Magmas – the Roles of Boron and Phosphorus” (David London, principal investigator): 12/88-01/90. Experimental petrologic study; design of a large-volume, 400 MPa internally-heated reaction vessel, and design and installation of the temperature control and pumping systems from components.

## **Graduate Experience**

- Graduate Research Assistant, National Science Foundation Grant “Principals of Lithophile Element Concentration in Silicic Magmas – the Role of Boron” (David London, principal investigator): 1986-1988. Experimental petrologic study; expansion of 200 MPa cold-seal pressure vessel system, and installation in new facilities.
- Graduate Research Assistant, University of Oklahoma Research Council Grant “Petrogenetic and Economic Significance of Wallrock Alteration Around the Tanco Rare-Element Pegmatite, Manitoba” (David London, principal investigator): 1986.
- Graduate Research Assistant, U.S. Bureau of Mines Allotment Grant “Phase Equilibria of Peraluminous Rare-Element Magmas – Experimental Study of Macusani Rhyolite” (David London, principal investigator): 1986.
- Graduate Research Assistant, U.S. Bureau of Mines Allotment Grant “Principals of Lithophile Element Enrichment in Silicic Magmas” (David London, principal investigator): 1985.
- Graduate Research Assistant, U.S. Bureau of Mines Allotment Grant “Petrogenesis of Rare-Element Pegmatites – Experimental Models as Guides to Exploration” (David London, principal investigator): 1985. Experimental petrologic study; design and installation of 200 MPa cold-seal pressure vessel system from components.
- Graduate Teaching Assistantships, University of Oklahoma: 1984-1986). (1) Economic geology of Metallic Ore Deposits (3 semesters); (2) Igneous and Metamorphic Petrology (2 semesters); and (3) Physical Geology for Science Majors (1 Semester)

## **Honors and Awards**

- Sigma Xi Advanced Student Research Award, University of Oklahoma: 1988
- Oklahoma Mining and Mineral Resources Research Institute Merit Award Fellowships (competitive awards): 1985-1986, 1986-1987, 1987-1988
- Pennzoil Scholarship, University of Oklahoma: 1985-1986
- Sigma Xi: student member 1986; full member 1988-1991
- Phi Kappa Phi National Honor Society; 1984
- Music Scholarship, university of Nevada, Las Vegas: 1975-1977

## **Grants**

1. National Science Foundation, Earth Sciences Division, Petrology & Geochemistry, “Multicomponent Diffusion and Speciation Reactions of Major Melt Components, High Field Strength Elements, and Ligands in Haplogranite Melt”: EAR-0124179, supplemental \$26,628 for Electron Microprobe Laboratory upgrades (with David London), 2002-2005.
2. Battelle Pacific Northwest National Laboratory, “Analysis of Titanate Ceramics and Autunite”: Task Ordering Agreement No. 4467, (with David London), 2002, \$7,000.
3. National Science Foundation Grant “Halogen Partitioning in Magmatic Systems” (David London and G.B. Morgan, co-pi’s), 1995-1998, \$49,345.
4. National Science Foundation Grant “Upgrade of Hardware, Computer and Peripheral Equipment, Electron Microprobe Laboratory, University of Oklahoma” (David London and G.B. Morgan, co-pi’s), 1994-1995, \$41,485.
5. National Science Foundation Grant “Study of Included Fluids, Fluid-Rock Interactions, and Graphite in the Continental Deep-Drilling Project (KTB), Bavarian Oberpfalz” (Jill D. Pasteris and G.B. Morgan, co-pi’s), 1992-1995: \$245,631.
6. Geological Society of America Graduate Research Grant, 1986: \$600.
7. Sigma Xi Grant-in-Aid of Research, 1986: \$300.
8. University of Oklahoma Graduate Student Association Grant, 1986: \$400.

## Professional Affiliations

American Geophysical Union

Microbeam Analysis Society

Microscopy Society of America

Mineralogical Association of Canada

Mineralogical Society of America

Oklahoma Microscopy Society (Executive Board Physical Sciences Representative: 1995-1997)

## PUBLICATIONS

### Articles

- Morgan, G.B. VI and London, D. (2003) Trace element partitioning at conditions far from equilibrium: Ba and Cs distributions between alkali feldspar and undercooled hydrous granitic liquid at 200 MPa. *Contrib. Mineral. Petrol.*, 144, 722-738.
- Acosta, A., London, D., Dewers, T.A., and Morgan, G.B. VI (2002) Dissolution of corundum and andalusite in H<sub>2</sub>O-saturated haplogranitic melts at 800°C and 200 MPa: Constraints on diffusivities and the generation of peraluminous melts. *J. Petrol.*, **43**, 1885-1908.
- London, D., Morgan, G.B. VI, and Wolf, M.B. (2001) Amblygonite-montebrazite solid solutions as monitors of fluorine in evolved granitic and pegmatitic melts. *Am. Mineral.*, **86**, 225-233.
- Lewis, J.C., Byrne, T.B., Pasteris, J.D., London, D., and Morgan, G.B. VI (2000) Pressure and temperature conditions during the assembly of the Tertiary Shimanto accretionary complex of southwest Japan: Constraints from fluid inclusions. *J. Metamorphic Geol.*, **18**, 319-333.
- Morgan, G.B. VI and London, D. (1999) Crystallization of the Little Three layered pegmatite-aplite dike, Ramona District, California. *Contrib. Mineral. Petrol.*, **136**, 310-330.
- Price, J.D., Hogan, J.P., Gilbert, M.C., London, D., and Morgan, G.B. VI (1999) Experimental study of titanite-fluorite equilibria in the A-type Mount Scott Granite: Implications for assessing F contents of felsic magma. *Geol.*, **27**, 951-954.
- London, D., Wolf, M.B., Morgan, G.B. VI, and Garrido, M.G. (1999) Experimental silicate-phosphate equilibria in peraluminous granitic magmas, with a case study of the Albuquerque Batholith at Tres Arroyos, Badajoz, Spain. *J. Petrol.*, **40**, 215-240.
- Morgan, G.B. VI, London, D., and Luedke, R.G. (1998) Petrochemistry of late-Miocene peraluminous silicic volcanic rocks from the Morococala field, Bolivia. *J. Petrol.*, **39**, 601-632.
- London, D., Morgan, G.B. VI, and Icenhower, J. (1998) Stability and solubility of pollucite in the granite system at 200 MPa H<sub>2</sub>O. *Canad. Mineral.*, **36**, 497-510.
- Novak, M., Burns, P.C., and Morgan, G.B. VI (1998) Fluorine variation in hambergite from granitic pegmatites. *Canad. Mineral.*, **36**, 441-446.
- Morgan, G.B. VI and London, D. (1996) Optimizing the electron microprobe analysis of hydrous alkali aluminosilicate glasses. *Amer. Mineral.*, **81**, 1176-1185.
- London, D., Morgan, G.B. VI, and Wolf, M. (1996) Boron in granitic rocks and their contact aureoles. In: E.S. Grew (ed.) Boron Mineralogy, Petrology, and Geochemistry. *Mineral. Soc. Amer. Rev. Mineral.*, **33**, 299-330.
- Morgan, G.B. VI, Chou, I-M., Pasteris, J.D., and Olsen, S.N. (1993) Re-equilibration of CO<sub>2</sub> fluid inclusions at controlled hydrogen fugacities. *J. Metamorph. Geol.*, **11**, 155-164.
- Seitz, J.C., Pasteris, J.D., and Morgan, G.B. VI (1993) Quantitative analysis of mixed volatile fluids by Raman microprobe spectroscopy: a cautionary note on spectral resolution and peak shape. *Appl. Spectros.*, **47**, 816-820.

- London, D., Morgan, G.B. VI, Babb, H.A., and Loomis, J.L. (1993) Behavior and effects of phosphorus in the system Na<sub>2</sub>O-K<sub>2</sub>O-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>-P<sub>2</sub>O<sub>5</sub>-H<sub>2</sub>O at 200 MPa (H<sub>2</sub>O). *Contrib. Mineral. Petrol.*, **113**, 450-465.
- Pasteris, J.D., Seitz, J.C., Morgan, G.B. VI, and Wopenka, B. (1993) CH<sub>4</sub>-rich inclusions from quartz veins in the Valley-and-Ridge province and the anthracite fields of the Pennsylvanian Appalachians – Discussion. *Amer. Mineral.*, **78**, 216-219.
- Morgan, G.B. VI, Chou, I-M., and Pasteris, J.D. (1992) Speciation in experimental C-O-H fluids produced by the thermal dissociation of oxalic acid dihydrate. *Geochim. Cosmochim. Acta*, **56**, 281-294.
- Palmer, M.R., London, D., Morgan, G.B. VI, and Babb, H.A. (1992) Experimental determination of fractionation of <sup>11</sup>B/<sup>10</sup>B between tourmaline and aqueous vapor: a temperature- and pressure-dependent isotopic system. In: R.S. Harmon and R.W. Hinton (eds.) *Frontiers in Isotope Sciences. Chem. Geol., Isotope Sciences Section*, **101**, 123-129.
- Morgan, G.B. VI (1991) Studies pertaining to the role of boron in granitic magmas. *The Compass*, **68**, 233-249.
- Morgan, G.B. VI and London, D. (1989) Experimental reactions of amphibolite with B-bearing aqueous fluids at 200 MPa: implications for tourmaline stability and partial melting in mafic rocks. *Contrib. Mineral. Petrol.*, **102**, 281-297.
- London, D., Morgan, G.B. VI, and Hervig, R.L. (1989) Vapor-undersaturated experiments with macusanite glass + H<sub>2</sub>O at 200 MPa, and the internal differentiation of granitic pegmatites. *Contrib. Mineral. Petrol.*, **102**, 1-17.
- London, D., Hervig, R.L., and Morgan, G.B. VI (1988) Melt-vapor solubilities and elemental partitioning in peraluminous granitic magmas: Experimental results with Macusani glass at 200 MPa. *Contrib. Mineral. Petrol.*, **99**, 360-373.
- Morgan, G.B. VI and London, D. (1987) Alteration of amphibolitic wallrocks around the Tanco rare-element pegmatite, Bernic Lake, Manitoba. *Amer. Mineral.*, **72**, 1097-1121.

## Abstracts

- Acosta, A., London, D., Dewers, T., and Morgan, G.B. VI (2002) Dissolution of quartz, albite, and K-feldspar into H<sub>2</sub>O-saturated melt at 800°C and 200 MPa: Diffusive transport properties of granitic melts at crustal anatexis conditions. *EOS*, **83**, 1419.
- London, D., Acosta, A., Dewers, T. and Morgan, G.B. VI (2001) Anatexis of metapelites: The ASI of S-type granites. *11<sup>th</sup> Goldschmidt Conference Abstract 3363, L.P.I. Contrib.*, **1088**, Lunar Planetary Institute, Houston.
- Evensen, J., Acosta, A., Dewers, T., Morgan, G.B. VI, and London, D. (2000) Toward a model for textural evolution in pegmatites. *GAC/AGC-MAC/GCU, GeoCanada 2000, Prog. Abstr.*, 946.
- London, D., Morgan, G.B. VI, and Wolf, M.B. (1999) Amblygonite-montebasite solid solutions as monitors of fluorine in evolved granitic and pegmatitic melts. *Geol. Soc. Amer. Abstr. Progr.*, **31**, 354.
- London, D. and Morgan, G.B. VI (1998) Experimental crystal growth from undercooled granitic melts: Nucleation response, texture, and crystallization sequence. *EOS*, **79**, S366.
- Wilson, M.J., Wolf, M.B., and Morgan, G.B. VI (1997) Experimental partial melting of a schist and boron-rich clay couple: Protoliths for tourmaline-bearing S-type granites? *Geol. Soc. Amer. Abstr. Progr.*, **29**, A78.
- Morgan, G.B. VI, London, D., and Luedke, R.G. (1995) Melt inclusion, matrix glass, and mineral compositions from a zoned S-type peraluminous rhyolite suite, Morococala volcanic field, Bolivia. *Third Hutton Symposium on the Origin of Granites, U.S. Geol. Surv. Circ.*, **1129**, 99-100.

- London, D., Wolf, M.B., Morgan, G.B. VI, and Garrido, M.G. (1995) The phosphorus cycle in peraluminous granitic magmas. Third Hutton Symposium on the Origin of Granites, *U.S. Geol. Surv. Circ.*, **1129**, 90-91.
- Price, J.D., Hogan, J.P., Gilbert, M.C., London, D., and Morgan, G.B. VI (1995) Fluorine in A-type granites: experimental study of the Mount Scott granite. *Geol. Soc. Amer. Abstr. Progr.*, **27**, 431.
- Price, J.D., Hogan, J.P., Morgan, G.B. VI, London, D., and Gilbert, M.C. (1995) Partial melting of the Mount Scott Granite at 850°C and 500 bars. *12<sup>th</sup> International Conference on Basement Tectonics*, 63-64.
- London, D., Wolf, M.B., and Morgan, G.B. VI (1994) Boron saturation in granitic magmas: tourmaline-biotite-cordierite equilibria. *Geol. Soc. Amer. Abstr. Progr.*, **26**, A-516.
- Wolf, M.B., London, D., and Morgan, G.B. VI (1994) Effects of boron on the solubility of cassiterite and tantalite in granitic liquids. *Geol. Soc. Amer. Abstr. Progr.*, **26**, A-450.
- Seitz, J.C., Pasteris, J.D., and Morgan, G.B. VI (1992) Cautionary note on analytical methodology for the quantitative analysis of CO<sub>2</sub>-CH<sub>4</sub>-N<sub>2</sub>-H<sub>2</sub> fluids by microsampling Raman spectroscopy. *Pan-Amer. Conf. Res. On Fluid Incl. IV, Progr. Abstr.*, **4**, A27.
- Morgan, G.B. VI, Chou, I-M., and Pasteris, J.D. (1991) Controlled-atmosphere experiments with CO<sub>2</sub> fluid inclusions: monitoring H<sub>2</sub> diffusion and mechanisms of re-equilibration. *Geol. Soc. Amer. Abstr. Progr.*, **23**, A336.
- Morgan, G.B. VI and Pasteris, J.D. (1991) Reaction pathways and metastability in experimental C-O-H fluids. *GAC-MAC-SEG Progr. Abstr.*, **16**, A85.
- Pasteris, J.D. and Morgan, G.B. VI (1991) Geological implications of speciation in experimental C-O-H fluids. *GAC-MAC-SEG Progr. Abstr.*, **16**, A95.
- Morgan, G.B. VI, London, D., and Kirkpatrick, R.J. (1990) Reconnaissance spectroscopic study of hydrous sodium aluminum borosilicate glasses. *Geol. Soc. Amer. Abstr. Progr.*, **22**, A167.
- London, D., Loomis, J.L., Huang, W., and Morgan, G.B. VI (1990) Behavior and effects of phosphorus in the system Ab-Or-Qz-H<sub>2</sub>O at 200 MPa (H<sub>2</sub>O). *Geol. Soc. Amer. Abstr. Progr.*, **22**, A302.
- Chou, I-M., Morgan, G.B. VI, and Pasteris, J.D. (1990) Speciation of C-O-H fluids produced by the thermal dissociation of oxalic acid dihydrate. *Pan-Amer. Conf. Res. On Fluid Incl. III, Progr. Abstr.*, **3**, 30.
- Brown, R.L., Morgan, G.B. VI, and Murphy, S. (1990) Predicted effects of the Southern Oklahoma Aulocogen upon late Cambrian-Ordovician geology in the Anadarko Basin. *OK Geol. Surv., Symp. On Late Cambrian-Ordovician Geology of the Southern Mid-Continent*, 118.
- Morgan, G.B. VI and London, D. (1988) Experimental reactions of amphibolite with boron-bearing aqueous fluids at 200 MPa: Tourmaline stability and partial melting in mafic rocks. *Geol. Soc. Amer. Abstr. Progr.*, **20**, A191.
- Morgan, G.B. VI and London, D. (1987) Behavior of boron and tourmaline stability in granitic systems. *Geol. Soc. Amer. Abstr. Progr.*, **19**, 777-778.
- London, D., Morgan, G.B. VI, and Hervig, R.L. (1987) Differentiation of peraluminous, volatile-rich silicic magmas: an experimental study of Macsuan glass. *Geol. Soc. Amer. Abstr. Progr.*, **19**, 749.
- London, D., Morgan, G.B. VI, and Hervig, R.L. (1987) Element partitioning and fractionation trends in volatile- and LILE-rich rhyolite. *EOS*, **68**, 450.
- Morgan, G.B. VI and London, D. (1986) Metasomatism of amphibolitic wallrocks around the Tanco rare-element pegmatite, Manitoba. *Geol. Soc. Amer. Abstr. Progr.*, **18**, 700.
- London, D. and Morgan, G.B. VI (1985) Wallrock alteration around the Tanco rare-element pegmatite, Manitoba: Relations to pegmatite evolution. *EOS*, **66**, 1154.
- Morgan, G.B. VI and London, D. (1985) Wallrock alteration around the Tanco rare-element pegmatite, Manitoba: Petrology of alteration halos. *EOS*, **66**, 1153-1154.