

VITA

ALEXANDRA NAVROTSKY

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Education:

Bronx High School of Science, 1960
University of Chicago, 1963 (B.S.)
University of Chicago, 1964 (M.S.)
University of Chicago, 1967 (Ph.D.)

Area of Specialization: Solid State Chemistry, Ceramics, Physics and Chemistry of Minerals,
Geochemistry

Professional Experience:

1967 – 1968 Research Associate, Technische Universität Clausthal, Germany, Institut für
Theoretische Huttenkunde

1968 – 1969 Research Associate, Pennsylvania State University, Dept. of Mineralogy and
Geochemistry

1969 – 1974 Assistant Professor, Arizona State University, Dept. of Chemistry

1970 – 1971 Visiting Research Associate, University of Chicago, James Franck Institute

1972 Visiting Scientist, Technische Universität Clausthal, Germany

1974 – 1978 Associate Professor, Arizona State University, Dept. of Chemistry

1974 Visiting Scientist, Bell Telephone Laboratories

1975 Visiting Lecturer, Massachusetts Institute of Technology

1976 Visiting Associate Professor, University of California at Berkeley

1976 – 1977 Program Director for Chemical Thermodynamics, National Science Foundation

1978 – 1985 Professor, Arizona State University, Depts. of Chemistry and Geology

1981 Visiting Professor, State University of New York at Stony Brook

1984 – 1985 Director, Center for Solid State Science, Arizona State University

1985 – 1997 Professor, Princeton University, Dept. of Geological and Geophysical Sciences,
Affiliate faculty, Dept. of Chemistry, Member, Princeton Materials Institute

1988 – 1991 Chair, Dept. of Geological and Geophysical Sciences, Princeton University

1988 Visiting Summer Faculty, I.B.M., T.J. Watson Research Center

1992 – 1997 Albert G. Blanke, Jr. Professor of Geological and Geophysical Sciences,
Princeton University

1997 – 2019 Interdisciplinary Professor of Ceramic, Earth, and Environmental Materials
Chemistry, University of California, Davis. Appointments in Departments of
Chemical Engineering and Materials Science (home department); Chemistry;
Land, Air and Water Resources; Geology

2001 – 2019 Edward Roessler Chair in Mathematical and Physical Sciences, UC Davis

2002 – 2019	<u>Director of the NEAT ORU, UC Davis</u>
2003 – 2019	<u>Distinguished Professor, UC Davis</u>
2013 – 2017	<u>Interim Dean</u> of Mathematical and Physical Sciences, College of Letters and Science, UC Davis
2019 – present	<u>Professor</u> , School of Molecular Sciences, and School for Engineering of Matter, Transport and Energy, Arizona State University
2019 – present	Director, Materials of the Universe, Arizona State University

Professional Organizations and Honorary Societies:

Phi Beta Kappa
Sigma Xi
American Ceramic Society
American Chemical Society
American Geophysical Union
Mineralogical Society of America
Materials Research Society
Geochemical Society
National Academy of Sciences
International Union of Pure and Applied Chemistry
World Academy of Ceramics

Honors and Awards:

1973 – 1975	Alfred P. Sloan Fellowship
1981	Mineralogical Society of America Award, Fellow
1982 – 1983	Arizona State University, Graduate College Distinguished Research Award
1988	American Geophysical Union, Fellow
1991 – 1992	Mineralogical Society of America, Vice President
1992 – 1993	Mineralogical Society of America, President
1993	Elected to National Academy of Sciences
1995	Ross Coffin Purdy Award of the American Ceramic Society, in recognition of the most valuable contribution to ceramic technical literature, 1993
1995	Doctor Honoris Causa, Uppsala University, Sweden (Paris Geophysical Inst.)
1997	Geochemical Society, Fellow
1999	Kreeger-Wolf Visiting Scholar, Northwestern University
2000	Alexander M. Cruickshank Award, Gordon Conference
2000	Hugh M. Huffman Memorial Award, The Calorimetry Conference
2000	Ceramic Educational Council Outstanding Educator Award
2001	American Ceramic Society, Fellow
2001	American Ceramic Society, Best Paper Award of the Nuclear and Environmental Technology Division
2002	Benjamin Franklin Medal in Earth Science
2002	Highly Cited Researchers Award, ISI Thomson Scientific
2002	Mineralogical Society (Great Britain), Fellow
2002	Urey Medal of the European Association of Geochemistry
2005	Spriggs Phase Equilibria Award of the American Ceramic Society
2006	Rossini Lectureship Award, 19th International Conference on Chemical Thermodynamics, Boulder, Colorado
2006	Harry H. Hess Medal of the American Geophysical Union
2007	Sloan Faculty Distinguished Service Award - University of California, Davis
2007	Outstanding Engineering Senior Career Research Award - University of California, Davis
2008	Honorary Professor at School of Environmental Sciences and Urban Studies, Shenzhen Graduate School, Peking University, China

2009 Roebling Medal of Mineralogical Society of America
 2009 Best University Paper Award, DOE Geoscience Grantee Meeting
 2009 Honorary Professorship, Sichuan University, China
 2009 International Union of Pure and Applied Chemistry, Fellow
 2011 Elected to American Philosophical Society
 2011 Featured Manuscript in the Journal of the American Ceramics Society -
 Thermochemistry of Lanthana- and Yttria-Doped Thoria
 2012 Honorary Professor, Three Gorges University, Yichang China
 2012 Cecil and Ida Green Senior Fellowship at the Geophysical Laboratory of the
 Carnegie Institute of Washington
 2016 Victor M. Goldschmidt Award, Goldschmidt Conferences, Geochemical Society
 2016 W. David Kingery Award, American Ceramic Society
 2017 World Academy of Ceramics, Elected to Science Professional Member
 2020 Jan Czochralski Award, European Materials Research Society
 2020 Journal of the American Ceramic Society, Best Paper Award for paper entitled
 "Thermodynamic Investigation of Lithium Borate Glasses and Crystals."
 2020 American Ceramic Society, Distinguished Life Member
 2020 Sigma Xi, Full Member
 2020 Ranked #25 globally in materials science in "Updated science-wide author
 database of standardized citation indicators," published in PLOS BIOLOGY
 2020 Best Oral Presentation (presented to Dr. Khansaa Al-Essa) for group paper
 entitled "Drop Solution Calorimetric Studies of Interface Enthalpy of Cubic
 Silver (I) Oxide (Ag₂O) Nanocrystals," work done in Navrotsky lab, 4th
 International Conference on Materials Sciences and Nanomaterials

Service:

1976 – 1985 Physics and Chemistry of Minerals, Advisory Board
 1977 – 1979 NASA: Subcommittee on Materials Processing in Space
 1979 – 1981 NSF: Advisory Committee, Division of Materials Research
 1980 Co-organizer, Conference on Structural Chemistry of Complex Solids, Castle Hot
 Springs, Arizona
 1980 – 1987 Calphad Journal, Advisory Board
 1981 National Science Foundation, Chair, Ad Hoc Oversight Review of Solid State
 Chemistry Program
 1981 – 1983 American Mineralogist, Associate Editor
 1981 – 1985 National Academy of Sciences, Committee on High Temperature Chemistry
 1981 – 2000 Advances in Physical Geochemistry, Advisory Board
 1982 Co-organizer (with P. Day) of U.S.-U.K. Workshop on Solid State Chemistry,
 Oxford, England
 1982 – 1985 Councilor, Mineralogical Society of America
 1983 – 1993 American Geophysical Union, Committee on Mineral Physics
 1983 National Science Foundation, Panel on Visiting Professorship for Women
 1983 – 1985 Mineralogical Society of America, Chair of 1984 MSA Award Committee, Chair of
 1985 Mineralogy-Petrology Grant Committee
 1984 National Science Foundation, Workshop on Materials Chemistry
 1985 Co-organizer (with S. W. Kieffer) of Mineralogical Society of America Short
 Course, "Microscopic to Macroscopic - from Atomic Environments to
 Thermodynamic Properties," May 1985, Chestertown, MD
 1985 – 1991 North American Editor, Physics and Chemistry of Minerals

1985 – 2000 Progress in Solid State Chemistry, Editorial Advisory Board

1986 – 1989 Stanford University, Earth Sciences Advisory Board

1986 – 2000 Series Editor, Oxford Monographs on Geology and Geophysics

1987 Convener, American Geophysical Union Chapman Conference on "Perovskite - A Structure of Great Interest to Geophysics and Materials Science," Bisbee AZ, October 1987

1988 Geophysical Laboratory, Carnegie Institution of Washington, Advisory Committee

1988 Local Organizing Committee, 11th International Symposium on the Reactivity of Solids, Princeton, NJ, June 1988

1989 – 1992 National Science Foundation, Advisory Committee on Earth Sciences

1990 – 1993 MIT Earth Sciences Advisory Committee

1990 National Science Foundation, Earth Sciences, Committee of Visitors, Geochemistry Program, Chair

1990 American Geophysical Union Fall Meeting, Symposium Convener "Mineral Physics of Materials, Near the Earth's Surface"

1991 – 1994 Harvard University, Department of Earth and Planetary Sciences, Visiting Committee

1991 National Science Foundation, Earth Sciences Committee of Visitors, Instrumentation, Chair

1991-1992 NSF Science and Technology Center for High Pressure Research (CHiPR), Executive Committees

1991 California Institute of Technology, Division of Geological Sciences, Visiting Committee

1992 Columbia University, Geological Sciences, Visiting Committee

1992 Spring American Geophysical Union Meeting, Symposium Co- Convener, "What Do We Really Know About the Mantle?"

1993 – 1994 Department of Energy Basic Energy Sciences Advisory Committee (BESAC)

1993 – 1996 American Geophysical Union, Bowie Medal Committee, Chair, 1996

1994 Convener, CSEDI Workshop on Mantle Models, North East, Maryland, May 1994

1995 Mineralogical Society of America, Roebling Medal Committee

1995 – 1997 NRC Board on Earth Sciences and Resources

1995 Organizer, Symposium on Mineral Thermodynamics, Goldschmidt Conference, State College, PA, May 1995

1995 – 1997 National Science Foundation, Geochemistry Panel

1996 National Science Foundation, MRSEC Panel

1996 – 1997 Review Committee for Institute of Geophysics and Planetary Physics (IGPP), University of California

1996 – 1997 Natural Materials Advisory Board Committee on Advanced Fibers for High Temperature Ceramic Applications

1996 – 1998 Organizing Committee, 12th International Zeolites Congress, Baltimore, MD, July 1998

1997 National Science Foundation, Earth Sciences Advisory Committee

1997 National Science Foundation, Earth Sciences Committee of Visitors, Instrumentation and Facilities Program, Chair

1998 – 2000	Journal of Materials Research, Principal Editor
1998	Arizona State University, MRSEC Advisory Committee
1998 - 1999	Geochemical Society, Board of Directors
1999 – 2005	Los Alamos National Laboratory, Earth and Environmental Science Divisional Review Committee
1999 – 2003	Sandia National Laboratory, Geoscience Advisory Committee
1999	Workshop on Mineral and Rock Physics, Organizer, Scottsdale, AZ, May 28-30, 1999
2000 – 2001	13th International Zeolite Conference, International Advisory Board, Montpellier, France
2000 – 2001	BES (Basic Energy Sciences), Council on Chemical Sciences
2001 – 2005	Los Alamos National Laboratory, Nuclear Materials Technology Division, Divisional Review Committee
2001	Co-organizer, Mineralogical Society of America Short Course on Nanoparticles in the Environment
2001	Co- Convener, Materials Research Society Symposium on Perovskites
2002	Co-organizer, NSF/DOE Workshop on Nanogeoscience
2002 – 2004	NRC Committee on Advanced Geochemical Methods for Managing Carbon
2002 – 2004	Science, Board of Reviewing Editors
2002 – 2003	Geochemical Society F.W. Clarke Award Committee
2003	Participant and Group Leader, USDA Workshop on Defining Agriculture Opportunities in Nanotechnology
2003 – 2008	Chemistry of Materials Editorial Advisory Board
2003 – 2004	Member, Nanotechnology Technical Advisory Group (TAG) for President's Council of Advisors on Science and Technology (PCAST)
2003 – 2006	Advisory Board, Environmental Molecular Science Institute, Notre Dame University
2005	Organizing Committee: International Conference on Perovskites – Properties and Applications
2006 – 2016	Science and Technology Committee, Los Alamos National Laboratory
2006	Phase Equilibria Program and Spriggs Phase Equilibria Award Subcommittees, The American Ceramic Society
2006 – 2008	Honors and Recognition Committee, American Geophysical Union
2006 – 2009	Finance Committee, Mineralogical Society of America
2006	Geo2000 – Geosciences Futures Committee, National Science Foundation
2007	Advisory Board Member of the 15th International Zeolite Conference, Beijing, China (15th IZC)
2007	Local Organizing Committee, XVIth International Symposium on the Reactivity of Solids, University of Minnesota
2007 – 2018	External Advisory Board, Delaware EPSCoR Research Infrastructure Improvement Program and the Center for Critical Zone Research
2007 – Present	“Master Scientist” on China III, Project with Sichuan University, Chengdu, China, Mountain Resources Engineering and Ecological Security
2008 – 2016	Science and Technology Committee, Los Alamos National Laboratory

2008 – 2011	AGU Honors and Recognition Committee
2009	Organizer, HTMC XIII, IUPAC Conference on High Temperature Materials Chemistry, Davis CA, Sept 2009
2009 – 2016	Science and Technology Committee, Lawrence Livermore National Laboratory
2009 – 2018	DOE Energy Frontier Research Center- Materials Science of Actinides, Executive Committee
2009 – 2014	DOE Energy Frontier Research Center- Nanoscale Controls on Geologic CO ₂ , P.I. Committee
2009 – 2018	DOE Energy Frontier Research Center on Extreme Environments, Advisory Board
2009 – 2014	DOE Energy Frontier Research Center on Fluid Interface Reactions, Structures, and Transport (FIRST), Advisory Board
2009 – 2014	DOE Energy Frontier Research Center for Inverse Design, Advisory Board
2010	UC Davis Chancellor's Blue Ribbon Committee on Research
2013 – 2014	International Program Committee member, Thermo of Mineralogy and Mineral Physics, 2014 Goldschmidt Conference
2015 – 2018	DOE Energy Frontier Research Center for Next Generation of Materials by Design: Incorporating Metastability, Advisory Board
2016	NSF Ceramics Program, Workshop on High Temperature Materials
2017	DOE Nuclear Energy (NE) Workshop on Molten Salt Reactors, Breakout Lead
2017	DOE Office of Science, Basic Research Needs in Future Nuclear Energy, Panel Lead
2017 - 18	NAS Committee on the Independent Assessment of Science and Technology for the Department of Energy Defense Environmental Cleanup Program
2018 - 19	University of California Presidential Appointee to the Board of Directors of the California Council on Science and Technology (CSST)
2018 - Present	American Chemical Society, Editorial Advisory Board for <i>ACS Earth and Space Chemistry</i>

Major Invited Lectures:

1985	Mineralogical Society of America, Short Course on Microscopic to Macroscopic
1986	Hoots Lecture, Stanford University
1986	Mineralogical Society of America, Short Course on Silicate Melts
1987	Mineralogical Society of America, Short Course on Thermodynamic Modeling
1992	Gordon Conference on Molten Metals and Melts
1995	Gordon Conference on Solid State Chemistry
1995	Gordon Conference on Zeolites
1995	Eyring Lectures, Arizona State University
1995	Mineralogical Society of America, Short Course on Silicate Melts
1996	NATO Advanced Study Institute on Actinides and the Environment
1996	50 Years of Materials Science at University of Pennsylvania Symposium
1996	Gordon Conference on High Temperature Chemistry
1997	Gordon Conference on Liquids

1998 Gordon Conference on Disordered Materials

1999 Kreeger-Wolf Lecture at Northwestern University

2001 Alexander M. Cruickshank Lecturer, Gordon Conference on High Temperature Materials

2002 Mineralogical Society of America Short Course on Nanoparticles in the Environment

2002 Franklin Medal in Earth Science Lecture

2003 Elizabeth C. Crosby Lecture Series, Materials Science and Engineering, University of Michigan

2004 Gordon Conference on Solid State Chemistry I

2004 Hassel Lecture, Norwegian Chemical Society, Oslo, Norway

2004 Gordon Conference on High Temperature Materials

2004 Gordon Conference on Ceramics

2004 University of Minnesota, Women in Science Lectures

2005 Goldschmidt Conference on Geochemistry, Urey Award Lecture

2005 Wohl Lecture, University of Delaware

2007 "The Nuclear Fuel Cycle: Fundamental Thermodynamic and Solid State Chemical Questions after Sixty Years," The Leroy Eyring Center for Solid State Science, Arizona State University

2008 Plenary Lecture: The 5th International Workshop on DV-X α : The Advanced Related Experiments and Theories on Materials Science and X-ray Spectroscopy & the 21st Annual Meeting of the Society for DV-X α Japan, Himeji, Japan.

2008 "Environment, Energy, Nanoscience," Working on Environmental Sciences in the 21st Century, Peking University, Beijing, China

2008 Plenary Lecture at the VII Brazilian Material Research Society Meeting

2009 Roebling Medal Lecture, Mineralogical Society of America

2010 Gordon Conference on High Temperature Materials, Processes, and Diagnostics, Colby College, ME

2010 Gordon Research Conference: High Temperature, Materials, Processes and Diagnostic, Waterville, ME

2010 Gordon Conference on Ceramics, Solid State Studies, Colby Sawyer College, NH

2011 SSI-18 International Conference on Solid State Ionics, Warszawa, Poland (invited lecture)

2011 Gordon Conference on Nanoporous Materials and Their Applications, Holderness, NH

2011 The 1st Central and Eastern European Conference of Thermal Analysis and Calorimetry Conference, Craiova, Romania, Plenary Lecture

2011 MS&T 2011 Conference, Columbus, OH

2011 Outstanding Women in Science Lecture, Indiana University, Bloomington, IN

2012 Invited Lecture, Los Alamos National Laboratory

2012 Cecil and Ida Green Lecture, Geophysical Laboratory of the Carnegie Institution of Washington

2013 Seaborg Lecture, Lawrence Berkeley National Laboratory

- 2013 William Mong Distinguished Lecture, University of Hong Kong
- 2013 Invited Lecture, International Conference of Physical Chemistry, Bucharest Romania
- 2013 Alfred R. Cooper Distinguished Lecture, The American Ceramic Society, MS&T 2013 Conference, Montreal, Quebec
- 2015 Symposium X – Frontiers of Materials Research Invited Speaker, “Energetics at the Nanoscale: Impacts for Geochemistry, the Environment, and Materials” Materials Research Society Spring Meeting
- 2016 Goldschmidt Award Lecture
- 2017 Institut de Chimie Séparative de Marcoule, France, Invited Lecture
- 2018 Master Distinguished Lecture, Shanghai Jiao Tong University, China
- 2018 CALPHAD 18 Conference, Mexico
- 2018 Goldschmidt Conference Keynote Speaker
- 2019 Heriot-Watt University, Edinburgh, Scotland, Invited Lecture
- 2019 Seaborg Seminar, Los Alamos National Laboratory
- 2019 Plenary Lecture, 14th International Conference on the Structure of Non-Crystalline Materials, Kobe, Japan
- 2020 Plenary Lecture, International Conference on Thermal Analysis and Calorimetry, Moscow, Russia (moved online due to COVID)
- 2020 Keynote, Materials Science and Engineering Congress, Darmstadt, Germany (moved online due to COVID)
- 2020 Invited Talk, Women of Distinction in Materials Science Online Workshop, Darmstadt, Germany

Patents:

- “Removal of Organic Structure Directing Agents from Inorganic Nano-Composite Materials,” A. Navrotsky, A. N. Parikh, U.S. Pat. Appl. Publ., 17pp. (2004).
- U.S. Patent No. 6,960,327 (Issued: November 1, 2005)
“Methods for Removing Organic Compounds from Nano-Compositic Materials” (UC Case No. 2003-121-1)
- U.S. Patent No. 7,141,857 (Issued: November 28, 2006)
“Semiconductor Structures and Methods of Fabricating Semiconductor Structures Comprising Hafnium Oxide Modified with Lanthanum, a Lanthanide-Series Metal, or a Combination Thereof”

ALEXANDRA NAVROTSKY

PUBLICATIONS - RESEARCH PAPERS

- “Enthalpies of Mixing in Silver Bromide-Alkali Bromide and Thallium Chloride-Alkali Chloride Liquid Mixtures,” L. S. Hersh, A. Navrotsky, and O. J. Kleppa, *J. Chem. Phys.*, **42**, 3752-3757 (1965).
- “High-Temperature Calorimetry in Liquid Oxide Systems. III. The Enthalpy of Formation of Magnesium-Aluminum Spinel,” A. Navrotsky and O. J. Kleppa, *Inorg. Chem.*, **5**, 192-193 (1966).
- “A Calorimetric Study of Molten Na₂MoO₄-MoO₃ Mixtures at 970 K,” A. Navrotsky and O. J. Kleppa, *Inorg. Chem.*, **6**, 2119-2121 (1967).

"Enthalpy of Transformation of a High-Pressure Polymorph of Titanium Dioxide to the Rutile Modification," A. Navrotsky, J. C. Jamieson, and O. J. Kleppa, *Science*, 158, 388-389 (1967).

"Enthalpy of the Anatase-Rutile Transformation," A. Navrotsky and O. J. Kleppa, *J. Am. Ceram. Soc.*, 50, 626 (1967).

"The Thermodynamics of Cation Distributions in Simple Spinel," A. Navrotsky and O. J. Kleppa, *J. Inorg. Nucl. Chem.*, 29, 2701-2714 (1967).

"Thermodynamics of Formation of Simple Spinel," A. Navrotsky and O. J. Kleppa, *J. Inorg. Nucl. Chem.*, 30, 479-498 (1968).

"Thermodynamics of A_3O_4 - B_3O_4 Spinel Solid Solutions," A. Navrotsky, *J. Inorg. Nucl. Chem.*, 31, 59-72 (1969).

"Enthalpies of Formation of Some Tungstates MWO_4 ," A. Navrotsky and O. J. Kleppa, *Inorg. Chem.*, 8, 756-758 (1969).

"Phase Equilibria and Thermodynamic Properties of Solid Solutions in the Systems ZnO - CoO - TiO_2 and ZnO - NiO - TiO_2 at 1050 °C," A. Navrotsky and A. Muan, *J. Inorg. Nucl. Chem.*, 32, 3471-3484 (1970).

"Synthesis of Mg_2GeO_4 from Tetraethylorthogermanate," A. Navrotsky, *J. Am. Ceram. Soc.*, 53, 696 (1970).

"Activity-Composition Relations in the Systems CoO - ZnO and NiO - ZnO at 1050°C," A. Navrotsky and A. Muan, *J. Inorg. Nucl. Chem.*, 33, 35-47 (1971).

"The Intracrystalline Cation Distribution and the Thermodynamics of Solid Solution Formation in the System $FeSiO_3$ - $MgSiO_3$," A. Navrotsky, *Amer. Miner.*, 56, 201-211 (1971).

"Enthalpies of Transformation Among the Tetragonal, Hexagonal and Glassy Modifications of GeO_2 ," A. Navrotsky, *J. Inorg. Nucl. Chem.*, 33, 1119-1124 (1971).

"The Enthalpy of the Ilmenite-Perovskite Transformation in Cadmium Titanate," J. M. Neil, A. Navrotsky, and O. J. Kleppa, *Inorg. Chem.*, 10, 2076-2077 (1971).

"Synthesis of Uvarovite Using a Sodium-Potassium-Borate Flux," J. Lowell, A. Navrotsky, and J. R. Holloway, *J. Am. Ceram. Soc.*, 54, 466 (1971).

"Thermodynamics of Formation of the Silicates and Germanates of Some Divalent Transition Metals and of Magnesium," A. Navrotsky, *J. Inorg. Nucl. Chem.*, 33, 4035-4050 (1971).

"Approximate Activity-Composition Relations in the System MgO - ZnO at 1205 ± 5 °C," D. S. Kenny and A. Navrotsky, *J. Inorg. Nucl. Chem.*, 34, 2115-2119 (1972).

"Thermodynamic Relations Among Olivine, Spinel and Phenacite Structures in Silicates and Germanates: I. Volume Relations and the Systems NiO - MgO - GeO_2 and CoO - MgO - GeO_2 ," A. Navrotsky, *J. Solid State Chem.*, 6, 21-41 (1973).

"Thermodynamic Relations Among Olivine, Spinel and Phenacite Structures in Silicates and Germanates: II. The Systems NiO - ZnO - GeO_2 and CoO - ZnO - GeO_2 ," A. Navrotsky, *J. Solid State Chem.*, 6, 42-47 (1973).

"Discussion of 'Equilibrium Cation Distributions in $NiAl_2O_4$, $CuAl_2O_4$, and $ZnAl_2O_4$,'" A. Navrotsky, *J. Am. Ceram. Soc.*, 56, 106 (1973).

"Estimate of Enthalpies of Formation and Fusion of Cordierite," A. Navrotsky and O. J. Kleppa, *J. Amer. Ceram. Soc.*, 56, 198-199 (1973).

"Ni₂SiO₄ -Enthalpy of the Olivine-Spinel Transition by Solution Calorimetry at 713°," A. Navrotsky, *Earth Planet. Sci. Lett.*, 19, 471-475 (1973).

"Sillimanite—Disordering Enthalpy by Calorimetry," A. Navrotsky, R. C. Newton, and O.J. Kleppa, *Geochim. Cosmochim. Acta*, 37, 2497-2508 (1973).

"Enthalpy of the Olivine-Spinel Transition in Magnesium Orthogermanate and the Thermodynamics of Olivine-Spinel-Phenacite Stability Relations," A. Navrotsky, in "Phase Transition-1973, Proceedings of the Conference on Phase Transitions and their Applications in Materials Science, University Park, Pa., May 23-25, 1973," L. E. Cross, Ed., *Pergamon Press*, 393-398 (1973).

"Thermodynamics of Binary and Ternary Transition Metal Oxides in the Solid State," A. Navrotsky, in "MTP International Reviews of Science, Inorganic Chemistry, Series 2, Vol. 5," D. W. A. Sharp, Ed., *Butterworths-University Park Press, Baltimore, MD*, 29-70 (1974).

"Thermodynamic Relations Among Olivine, Spinel and Phenacite Structures in Silicates and Germanates: III. The System CuO-MgO-GeO₂," A. Navrotsky, *J. Solid State Chem.*, 11, 10-16 (1974).

"Festkörperthermodynamik: Chemie des festen Zustandes," H. Schmalzried and A. Navrotsky, Verlag Chemie, Weinheim, Germany (1975). (In German).

"Thermodynamic Relations Among Olivine, Spinel and Phenacite Structures in Silicates and Germanates: IV. The System ZnO-MgO-GeO₂," A. Navrotsky, *J. Solid State Chem.*, 12, 12-15 (1975).

"Stability of Two Cobalt Titanate Defect Spinels," J.P. Sharples and A. Navrotsky, *J. Solid State Chem.*, 12, 122-126 (1975).

"Thermodynamics of Formation of Some Compounds with the Pseudobrookite Structure and of the FeTi₂O₅-Ti₃O₅ Solid Solution Series," A Navrotsky, *Amer. Miner.*, 60, 249-256 (1975).

"Ionicity and Phase Transitions at Negative Pressures," A. Navrotsky and J. C. Phillips, *Phys. Rev. B*, 11, 1583-1586 (1975).

"Thermochemistry of Chromium Compounds, Especially Oxides at High Temperature," A. Navrotsky, *Geochim. Cosmochim. Acta*, 39, 819-832 (1975).

"Silicates and Related Minerals: Solid State Chemistry and Thermodynamics Applied to Geothermometry and Geobarometry," A. Navrotsky, *Prog. Solid State Chem.* 11, 203-264 (1976).

"Thermodynamic Relations Among Olivine, Spinel and Phenacite Structures in Silicates and Germanates: V. The System MgO-'FeO'-GeO₂," A. Navrotsky and L. Hughes, Jr., *J. Solid State Chem.*, 16, 185-188 (1976).

"High Temperature Heat Content and Diffuse Transition in Lead Fluoride," C. E. Derrington, A. Navrotsky, and M. O'Keefe, *Solid State Comm.*, 18, 47-49 (1976).

"Co²⁺ as a Chemical Analogue for Fe²⁺ in High Temperature Experiments in Basaltic Systems," W. E. Coons, J. R. Holloway, and A. Navrotsky, *Earth Planet. Sci. Lett.*, 30, 303-308 (1976).

"Spinel Disproportionation at High Pressure: Calorimetric Determination of Enthalpy of Formation of Mg₂SnO₄ and Co₂SnO₄ and Some Implications for Silicates," A. Navrotsky and R. B. Kasper, *Earth Planet. Sci. Lett.*, 31, 247-254 (1976).

"Thermochemistry of Some Pyroxenes and Related Compounds," A. Navrotsky and W. E. Coons, *Geochim. Cosmochim. Acta*, 40, 1281-1288 (1976).

- "Calculation of Effect of Cation Disorder on Silicate Spinel Phase Boundaries," A. Navrotsky, *Earth Planet. Sci. Lett.*, 33, 437-442 (1977).
- "Calculation of Subsolidus Phase Relations in Carbonates and Pyroxenes," A. Navrotsky and D. Loucks, *Phys. Chem. Min.*, 1, 109-127 (1977).
- "Refinement of the Crystal Structure of Mg_2GeO_4 Spinel," R. B. Von Dreele, A. Navrotsky, and A. L. Bowman, *Acta Cryst.*, B33, 2287-2288 (1977).
- "Chemical Thermodynamics - Areas of Current Interest," A. Navrotsky, *Bull. Chem. Thermodyn.*, 20, 573-576 (1977).
- "Geological Applications of High Temperature Reaction Calorimetry," A. Navrotsky in "Thermodynamics in Geology, Proceedings of the NATO Advanced Study Institute held in Oxford, England, 17-27 Sept. 1976," D. G. Fraser, Ed., *D. Reidel Publishing Co., Dordrecht, Holland*, 1-10 (1977).
- "Progress and New Directions in High Temperature Calorimetry," A. Navrotsky, *Phys. Chem. Miner.* 2, 89-104 (1977).
- "Thermodynamics of Element Partitioning: (1) Systematics of Transition Metals in Crystalline and Molten Silicates and (2) Defect Chemistry and the Henry's Law Problem," A. Navrotsky, *Geochim. Cosmochim. Acta*, 42, 887-902 (1978).
- "Experimental Study of the Electronic and Lattice Contribution to the VO_2 Transition," F. Pintchovski, W. S. Glausinger, and A. Navrotsky, *J. Phys. Chem. Solids*, 39, 941-949 (1978).
- "Solid State Thermodynamics," H. Schmalzried and A. Navrotsky, *Akademie-Verlag: Berlin* (1978).
- "Direct Calorimetric Measurement of Enthalpies of Aqueous Sodium Chloride Solutions at High Temperatures and Pressures," R. B. Kasper, J. R. Holloway, and A. Navrotsky, *J. Chem. Thermodyn.*, 11, 13-24 (1979).
- "Calorimetric Study of the Stability of High Pressure Phases in the Systems $CoO-SiO_2$ and " FeO "- SiO_2 and Calculation of Phase Diagrams in $MO-SiO_2$ Systems," A. Navrotsky, F. S. Pintchovski, and S. Akimoto, *Phys. Earth Planet. Interiors*, 19, 275-292 (1979).
- "Thermodynamic Parameters of $CaMgSi_2O_6$ - $Mg_2Si_2O_6$ Pyroxenes Based on Regular Solution and Cooperative Disordering Models," T. J. B. Holland, A. Navrotsky, and R. C. Newton, *Contrib. Mineral. Petrol.*, 69, 337-344 (1979).
- "Calorimetry: It's Application to Petrology," A. Navrotsky, *Annual Review of Earth and Planetary Sciences* 7, 93-115 (1979).
- "Application of High Temperature Calorimetry to Mineral Reactions," A. Navrotsky, in "Iwanami Series of Geoscience, Vol. 4, Materials Science of the Earth III, Geochemistry of Rocks and Minerals," S. Banno and Y. Matsui, Eds., *Iwanami Publishing Co., Tokyo, Japan*, 127-143 (1979). (In Japanese).
- "The Igneous System $CaMgSi_2O_6$ - $CaAl_2Si_2O_8$ - $NaAlSi_3O_8$: Variations on a Classic Theme by Bowen," D. F. Weill, R. Hon, and A. Navrotsky, in "Physics of Magmatic Processes," R. B. Hargraves, Ed., *Princeton Univ. Press*, 49-92 (1980).
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