

Mines Branch Information Circular IC 183

DIRECTORY OF HIGH-TEMPERATURE CONDENSED STATES
RESEARCH IN CANADA, JULY 1966

by

Norman F. H. Bright*

- - - -

SYNOPSIS

A list is given of establishments in Canada in which research on high-temperature condensed states is currently being conducted. The names of the researchers involved and an indication of their specific fields of interest are also included.

*Head, Physical Chemistry Section, Mineral Sciences Division, Mines Branch, Department of Mines and Technical Surveys, Ottawa, Canada.

Direction des mines

Circulaire d'information IC 183

RÉPERTOIRE DES RECHERCHES SUR LES ÉTATS CONDENSÉS À HAUTE
TEMPÉRATURE AU CANADA, JUILLET 1966

par

Norman F. H. Bright*

RÉSUMÉ

L'auteur donne la liste des établissements canadiens où l'on se livre à des recherches sur les états condensés à haute température. Il donne aussi les noms des chercheurs et mentionne les domaines où ils poursuivent leurs recherches.

*Chef, Section de la chimie physique, Division des sciences minérales, Direction des mines, ministère des Mines et des Relevés techniques, Ottawa, Canada.

CONTENTS

	<u>Page</u>
Synopsis	i
Résumé	ii
Introduction	1
Directory of High-Temperature Condensed States Research in Canada, July 1966	3
High-Temperature Condensed States Research in the Province of Nova Scotia	4
High-Temperature Condensed States Research in the Province of Quebec	6
High-Temperature Condensed States Research in the Province of Ontario	8
High-Temperature Condensed States Research in the Province of Manitoba	14
High-Temperature Condensed States Research in the Province of Alberta	15
High-Temperature Condensed States Research in the Province of British Columbia	16

INTRODUCTION

In March, 1960, in the first of a quarterly series of Information Circulars dealing with high-temperature condensed states research published in Canada, issued by the Mines Branch, Department of Mines and Technical Surveys, a directory was included giving the locations, names and specific fields of interest of as many workers in this field as could be located by the compiler at that time. Since then, these bibliographic Information Circulars have been issued on a quarterly basis as an activity of the Commission on High Temperatures and Refractories of the International Union of Pure and Applied Chemistry. The compiler of these documents sits as the Canadian representative on this Commission.

At a meeting of this Commission, held in Paris in July, 1965, as part of the XXIIIrd Conference on Pure and Applied Chemistry, which the compiler attended, it was decided that the time was now appropriate for an up-dating of these lists of workers and for the preparation of new lists of locations, workers and fields of interest on an international basis. Accordingly, all the regular recipients of these quarterly bibliographic Information Circulars in Canada were sent a letter inviting them to specify the necessary details in order to make the compilation of such a revised list possible. From the replies to these letters, received up to the end of June 1966, and from his own personal knowledge of the field, the compiler has prepared the lists which comprise the present document. It is realised that, of necessity, these lists will, in all probability, not be either complete or entirely correct. However, they do represent a considerably wider coverage of the relevant fields than was given in the 1960 list.

In the earlier lists, it was convenient to sub-divide the compilation according to the same subject headings that are used in the bibliographic Information Circulars. However, in view of the increased number of people involved and their multiplicity of interests in many cases, it has been found more convenient, in the present document, to sub-divide the lists on a provincial basis according to the locations at which the work is conducted, rather than according to the type of work.

The compiler would very much appreciate being advised of any errors or omissions from these lists in order that, if they should be substantial in number, a supplementary list could be prepared at a somewhat later date, to include those omitted from the present document.

Similar lists are being prepared in the other countries that participate in the activities of the IUPAC Commission on High Temperatures and Refractories. These include the U.S.A., the United Kingdom, France, Italy, Norway, Poland, the Netherlands, India and Australia, as well as Canada. When they become available, all the lists from these various countries will be distributed to all interested parties in all the participating countries. In this way, a quite extensive picture of the international effort in this branch of science will be built up and those involved will have much information available concerning the locality of work that may be in progress in their own specific fields of interest.

The quarterly bulletins of bibliographic information will continue to be issued as heretofore and the next number should appear in the immediate future.

If there should be any queries concerning these documents or any of the other activities of the Commission on High Temperatures and Refractories of IUPAC, they should be addressed to the compiler of this present report thus:

Dr. Norman F. H. Bright
Mineral Sciences Division
Mines Branch
Department of Mines and Technical Surveys
555 Booth Street
Ottawa 4, Ontario, Canada.

DIRECTORY OF HIGH-TEMPERATURE CONDENSED STATES
RESEARCH IN CANADA, JULY 1966

High-Temperature Condensed States Research in
the Province of Nova Scotia

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
Dalhousie University Dept. of Chemistry Halifax, Nova Scotia	Dean Walter R. Trost Dr. Osvald Knop	Refractory metals and alloys (titanium, chromium, etc.); levitation melting; physical properties; theoretical studies. Chalcogenides of the transition elements; complex oxides; structure, phase relations and physical properties.
National Research Council Atlantic Regional Laboratory Halifax, Nova Scotia	Dr. C.R. Masson Dr. S.G. Whiteway Dr. H. Kojima Dr. I.B. Smith Dr. D. K. Gilding Dr. J. Cameron Dr. A. Mitchell	Diffusion of gases in liquid metals and alloys. Thermodynamics and structure of liquid silicates. Determination of gases in metals by isotopic dilution. Kinetics of reactions between gases and liquid alloys. Mass transfer studies with liquid metals. Studies of contact potentials at high temperatures. Cryoscopic studies in fused halides. Purification of inorganic fluorides. Thermodynamics of cobalt and nickel silicates. Activities of cobalt and nickel in platinum/rhodium alloys. Stoichiometry of cobalt and nickel oxides. Thermodynamics of manganous phosphates. Thermodynamics of liquid manganese/gold alloys. Kinetics of desulphurization and decarbonization of liquid iron and its alloys. Infrared studies of silicates.

Continued

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
Nova Scotia Technical College Dept. of Chemical Engineering Halifax, Nova Scotia	Dr. (Mrs.) L.M. Castelliz Mr. R.J. Routil Dr. M.L. Baker	Chemical preparation methods, phase equilibria, sintering properties, structural and electrical properties of oxide materials based on the perovskite and pyrochlore structure. Structure and magnetic properties of Heusler-phase- based alloys.
St. Francis-Xavier University Chemistry Department Antigonish Nova Scotia	Dr. E.A. Secco	Kinetics and thermodynamics of high-temperature inorganic reactions.

High-Temperature Condensed States Research in
the Province of Quebec

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
Aluminium Laboratories Ltd. P.O.Box 250 Arvida, Quebec	Dr. E.A. Hollingshead Dr. E.W. Dewing Dr. J.G. Lindsay Dr. V.A. Braunwarth	Fused salts and high- temperature reactions. Ceramics and refractories.
Canadian Refractories Ltd. Research Laboratories Grenville, Quebec	Dr. G.R. Rigby Mr. L.E. Myner Mr. L.J. Davies Mr. D. Hayes Mr. J.D. Perry Mr. R.Y. Poulin Mr. R.J. Brunet	High-temperature phase equilibria in systems involved in chrome-magnesia and other refractory brick. Diffusion in magnesia-chrome systems. Diffusion in magnesia-chrome systems. Erosion of chrome- magnesia brick in fayalite-type slags. Measurements of moduli of elasticity and rupture up to 1400°C, and of creep up to 1000°C in chrome-magnesia refractory brick systems. Kinetics of sintering of magnesia powders. Construc- tion of electrical resistor furnaces for temperatures up to 1850°C. Measurement of moduli of elasticity and rupture up to 1400°C. Construction of furnaces for use with propane/air mixtures up to 1800°C. Erosion of chrome-magnesia brick in fayalite-type slags. Study of effect of grain-size distribution in magnesia-chrome refractory brick.

Continued

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
<p>Noranda Research Centre 240 Hymus Blvd. Pointe Claire, Quebec</p>	<p>Dr. W.H.Gauvin Dr. N.J.Themelis Dr. W.C.Cooper</p> <p>Dr. P. Tarassoff Mr. J.C. Yannopoulos Mr. P. Spira</p> <p>Dr. J.M.Toguri Dr. J.M.Rawling Mr. M.B.I. Janjua</p>	<p>Heat, mass and momentum transfer at high temperatures. Reactions at temperatures above 1000°C.</p> <p>Momentum transfers and reaction kinetics at high temperatures.</p> <p>Phase diagrams of the Fe-Se and Cu-Ag-Se systems. Fayalite slag/sulphide matte equilibria.</p>
<p>Quebec Iron and Titanium Corp. Research Department P.O.Box 40 Sorel, Quebec</p>	<p>Mr. J.M. Noy Mr. Herbert Y. Lee Mr. Benoit Bernard Mr. Frank H. Baugh Mr. Walter Marik Mr. E. Zaccaria</p>	<p>Research and development work on the electric arc smelting of ilmenite ores to produce high- TiO₂ slags.</p>
<p>Shawinigan Chemicals Limited Research Department Shawinigan, Quebec</p>	<p>Dr. D.S. Downing Dr. H.S. Johnson</p>	<p>Chemistry of systems such as calcium carbide-carbon- calcium oxide and silica-iron oxide-ferrosilicon-silicon carbide.</p>
<p>University of Montreal Department of Chemistry Montreal, Quebec</p>	<p>Dr. M. Bourgon</p>	<p>Structure and reactions of sulphides and of intermetallic compounds.</p>

High-Temperature Condensed States Research in
the Province of Ontario

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
Atomic Energy of Canada Limited Chalk River Nuclear Laboratories Chalk River, Ontario	Dr. J. Ross MacEwan Dr. A.M. Ross Dr. J.A. Davies Mr. G.H. Chalder	Grain growth, rare gas diffusion, and electrical resistivity of uranium compounds at tempera- tures mostly above 1500°C. Swelling of fissile materials, i.e. the behaviour of rare gases in uranium compounds that melt at temperatures over 1500°C. Temperature effects on the penetration of energetic ion beams into crystal structures. Sintering mechanism of uranium dioxide.
Carleton University Dept. of Chemistry Ottawa 1, Ontario	Dr. J.M. Holmes Dr. D.R. Wiles	Gas adsorption on the surfaces of solids; use of ceramics and refractories as adsorbents. Radiation damage; nuclear recoil and "hot atom" reactions.
Cyanamid of Canada Limited P.O. Box 330 Niagara Falls Ontario	Dr. M. Mocek Dr. B.R. Davis	Calcium carbide nitrogenation diffusional kinetics and equilibria. Calcium carbide formation, kinetic studies. Calcium carbide formation, kinetic studies.
Dominion Magnesium Limited Haley, Ontario	Mr. H.A. Timm Mr. A. Froats Mr. D. Peplinski	Metallurgical reactions involving magnesium, calcium and other reactive metals.
Imperial Oil Enterprises Ltd. Research Department P.O. Box 3022 Sarnia, Ontario	Dr. G.W. Gurd	

Continued

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
<p>McMaster University Dept. of Metallurgy Hamilton, Ontario</p>	<p>Dr. J.S.Kirkcaldy Dr. W.W.Smeltzer</p>	<p>Reactions and properties of ferrous metals and alloys. Theory of metallurgical processes.</p>
<p>Department of Mines and Technical Surveys, Mines Branch Booth Street Ottawa 4, Ontario</p>	<p><u>Physical Metallurgy Division:</u> Dr. F. Weinberg Mr. H.V. Kinsey Dr. K. Winterton <u>Fuels Division:</u> Dr. B. I. Parsons <u>Mineral Processing Division:</u> Mr. J. G. Brady Mr. V.D. Svikis Dr. V.V.Mirkovich <u>Extraction Metallurgy Division:</u> Dr. T.R. Ingraham Dr. M.C.B.Hotz Mr. G.E. Viens Mr. R.A.Campbell <u>Mineral Sciences Division:</u> Mr. W.R. Inman Mr. G.H. Faye Dr. L.J.P.Cabri Dr. N.F.H.Bright Dr. A.H. Webster Dr. Sutarno Dr. A.Jongejan Mr. R.H. Lake Dr.N.F.H.Bright</p>	<p>Very pure metals; segregation at grain boundaries. Properties of refractory metals. Welding of metals and alloys. Oxide cracking catalysts. Properties of refractories and ceramics; processes occurring during firing of same. DTA, TGA, pyrometallurgical reactions with sulphates. Kinetics of pyrometallurgical smelting operations. New fire assay methods for platinum metals and gold. Phase equilibria in sulphide mineral systems. Phase equilibria and sintering properties in electronic and magnetic ceramic systems. Phase equilibria in multi-oxide refractory systems. Differential thermal and thermogravimetric analysis in mineralogical and metallurgical problems. Phase equilibria in niobate and tantalate systems and in the titanium-oxygen system.</p>

Continued

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
National Research Council Division of Applied Chemistry Ottawa 7, Ontario	Dr. W. A. Alexander Dr. L. D. Calvert Dr. J. B. Taylor Dr. M. Cohen Dr. D. Caplan	Devices for achieving temperatures above 1500°C. Properties of refractory metals and intermetallic compounds at all temperatures up to, and above, 1500°C. Phase equilibrium studies in metal-metalloid systems. Corrosion and oxidation mechanisms on metals.
National Research Council Division of Applied Physics Ottawa 7, Ontario	Dr. H. Preston-Thomas Dr. M. J. Laubitz Dr. T. Matsumura Dr. P. Kelly	Standards of measurement of high temperatures. Thermal and electrical properties of pure metal systems. Conduction phenomena in oxide systems. Luminescence mechanisms in non-metallic systems.
National Research Council Division of Pure Chemistry Ottawa 2, Ontario	Dr. E. A. Flood	Structure of graphite; adsorption properties of graphite and other adsorbents.
National Research Council Division of Pure Physics Ottawa 2, Ontario	Dr. W. B. Pearson	Structures in metal and alloy systems.
Norton Company P.O. Box 220 Chippawa, Ontario	Dr. G. R. Finlay Mr. G. R. Watson Mr. J. J. Scott Mr. G. G. Whybourne	Refractory carbides, oxides, nitrides, abrasives, etc. Fused refractory oxides such as magnesia and urania, refractory cements, boron carbide. Arc furnace controls and operations.

Continued

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
	<p>Mr. W.H. Weldon</p> <p>Mr. E.C. Lowe Mr. G. Kinney</p> <p>Mr. D.W. Marshall Mr. E.A. Pett</p> <p>Mr. L. J. Beaudin Mr. J.E. Patchett Mr. R. W. Trischuk</p> <p>Mr. H.J. Bartlett</p>	<p>Arc furnace feed and reaction kinetics.</p> <p>Growth and application of electronic grades of silicon carbide; reaction studies on silicon carbide.</p> <p>Zirconia-alumina abrasives.</p> <p>Ternary compositions of potential abrasive use; crystallographic studies of hard, high-temperature materials.</p> <p>Methods of fabricating carbides, borides and nitrides; applications thereof.</p>
<p>Ontario Research Foundation 43 Queen's Park Crescent East Toronto 5 Ontario</p>	<p>Dr. H.G. McAdie</p> <p>Dr. M. Krishna Murthy Miss L. Higgins Mr. K. el Assal</p> <p>Mr. P. van Loan</p> <p>Mr. A.J. Last</p> <p>Mr. R.L. Cavanaugh</p>	<p>Differential thermal analysis. Thermogravimetric analysis.</p> <p>Crystal chemistry and phase relations in GeO₂ systems; properties and structure of GeO₂-based glasses; structure of silicate glasses.</p> <p>Structure and properties of β-Al₂O₃-type compounds.</p> <p>Sonic and ultrasonic combustion.</p> <p>Jet smelting; oxygen/fuel burner systems.</p>
<p>Ottawa University Dept. of Geology Ottawa 2, Ontario</p>	<p>Dr. M. G. Best Dr. D.D. Hogarth</p>	<p>Equilibrium studies in systems of geological interest.</p>
<p>Queen's University Chemistry Dept. Kingston, Ontario</p>	<p>Dr. R.D. Heyding</p>	<p>Preparation, structure and properties of chalcogenides, pnictides, etc., of transition metals.</p>

Continued

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
Steel Company of Canada Hamilton Ontario	Dr. Roy J. Littlewood	Metallurgical reactions involving ferrous metals and slags at high temperatures.
University of Toronto Department of Metallurgy and Materials Science Toronto 5 Ontario	Dr. L.M. Pidgeon	Metallurgy of high-temperature reduction of refractory oxides, carbides, etc.
	Dr. S.N. Flengas	Kinetics and thermodynamics of high-temperature fused- salt reactions; electro- chemistry of metal production from fused salts.
	Dr. H.U. Ross Mr. G.G. Charette	Thermodynamic data for reactions involving oxidation of metals using an electrolytic cell with a zirconia-lime solid electrolyte.
	Mr. E.U. Chukukere	Thickening of titaniferous slags during reduction.
	Mr. R. Dheer	Magnetic conversion of siderite (FeCO ₃).
	Mr. R. Gomez	Solid-state diffusion across FeO/SiO ₂ and Mn/MnO ₂ interfaces.
	Mr. H.O. Lien	Identification of compounds in sintered iron ores.
	Mr. P.K. Strangway	Reduction kinetics of iron oxides with particular refer- ence to the "rate minimum" observed in the reduction of magnetite.
	Mr. T.T. Toomver	Effect of roasting procedure on the magnetic properties of artificial magnetite.
	Dr. A. W. Lund	

Continued

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
University of Western Ontario Faculty of Engineering Science London, Ontario	Dr. G.A. Geach Dr. I. J. Duerden Dr. C. Roy Dr. J. Sheasby	Phase equilibria. Oxide films on zirconium. High-temperature oxidation of niobium.

High-Temperature Condensed States Research in
the Province of Manitoba

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
University of Manitoba Department of Chemistry Winnipeg Manitoba	Dr. A.N.Campbell Dr. E.M.Kartzmark	Phase equilibria in fused-salt systems.
University of Manitoba Department of Geology Winnipeg Manitoba	Dr. A.C.Turnock	Phase equilibria among silicates especially $MgSiO_3$, $FeSiO_3$ and $CaAl_2Si_2O_8$. Melting relations in the system $MgSiO_3-FeSiO_3-CaSiO_3$.

High-Temperature Condensed States Research in
the Province of Alberta

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
Research Council of Alberta 87th Avenue and 114th Street Edmonton, Alberta	Dr. R.A.S. Brown	Gas-solid reactions at high temperatures - direct reduc- tion of oxides and chlorides, the decomposition of ores, and the pyrolysis of coal.
Sherritt-Gordon Ltd. Research Department Fort Saskatchewan Alberta	Dr. V.N. Mackiw	Powder metallurgy and reactions involving homogeneous reduction of nickel, cobalt and other metals.
University of Alberta Department of Chemistry Edmonton, Alberta	Dr. H.E. Gunning Dr. R.N. O'Brien Dr. J.A. Plambeck	Chemistry and electrochemistry of molten salts and of solutions of metal ions in them.

High-Temperature Condensed States Research in
the Province of British Columbia

Location	Name(s) of Scientist(s) Involved	Specific Field(s) of Research Interest
University of British Columbia Department of Metallurgy Vancouver 8 British Columbia	Dr. W.M. Armstrong Dr. J.A. Lund Dr. C.S. Samis	Dispersion hardening of iron with refractory oxides. Metal/metal oxide systems. Ionic equilibria in silicate melts. Fused salt/metal equilibria at temperatures up to 1000°C. Oxygen potential measurements by solid-state electrolytes in alloy/slag equilibria.
	Dr. I.H. Warren	Generation of high tempera- tures; use of DC and RF plasma devices in refractory metal production. Thermal diffusivity, thermo- electric and electrical con- ductivity measurements of uranium compounds. Hot-pressing of refractory materials such as uranium carbide.
	Dr. A.C.D. Chaklader	Reactive hot-pressing of oxides; deformation of oxides at high temperatures; reactive hot-pressing of ceramic/metal composites. Dispersion hardening of glass. High-temperature electrical conductivity of oxides and refractory compounds. Theory of hot pressing.