

Mines Branch Information Circular IC 117

DIRECTORY AND BIBLIOGRAPHY OF HIGH TEMPERATURE
CONDENSED STATES RESEARCH IN CANADA
AND ELSEWHERE, 1959.

by

Norman F.H. Bright

SYNOPSIS

This is the first of an intended quarterly series of bulletins giving bibliographies of work in the high temperature condensed state field that has been published in Canada and elsewhere. This report covers the year 1959 for Canada, and the latter part of 1959 for other countries such as the U.S.A., the U.K., the U.S.S.R., India, Austria, France, Belgium, and Scandinavia.

Lists of establishments and workers engaged in this type of work in Canada are given, together with the specific fields of interest of the workers concerned.

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Direction des mines
Circulaire d'information IC 117

RÉPERTOIRE ET BIBLIOGRAPHIE DES RECHERCHES
EFFECTUÉES DANS LE DOMAINE DES ÉTATS CONDENSES
AUX TEMPÉRATURES ÉLEVÉES, AU CANADA
ET AILLEURS, EN 1959

par

Norman F.H. Bright^A

RÉSUMÉ

Voici le premier d'une série de bulletins trimestriels destinés à recenser les travaux exécutés dans le domaine des états condensés aux températures élevées, tant au Canada qu'à l'étranger. Le présent rapport porte sur l'année 1959, en ce qui concerne le Canada, et à la dernière partie de 1959, pour d'autres pays tels que les É.-U., le Royaume-Uni, l'URSS, l'Inde, l'Autriche, la France, la Belgique et la Scandinavie.

Y figurent l'énumération des établissements et des chercheurs qui s'intéressent à ce genre de travaux au Canada, ainsi que la liste des domaines précis qui intéressent les chercheurs en cause.

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PART I

INTRODUCTION

One of the purposes of the International Union of Pure and Applied Chemistry (hereinafter referred to as IUPAC) is to facilitate the dissemination of chemical knowledge and information on a world-wide basis. In achieving this objective, it has been found convenient to set up various Commissions whose fields of interest are limited and specified. One such Commission is that on High Temperatures and Refractories. It is one of the functions of these Commissions to collect information relative to the nature of work being done in their particular fields in the various scientifically active countries, and to distribute this information, giving the names of the workers, their locations, and their particular spheres of interest, to all interested parties throughout the world. Another related function is to collect and circulate periodic bibliographies of research work published in the various countries, giving details of the names of the authors, the titles of the papers, and the complete journal references. This information will obviously be of great use to workers in the various fields, by allowing them to see rapidly where related work has been published. It is not intended at the present juncture to publish abstracts of the work. The view taken officially by IUPAC is that if the worker has any real interest in the field, he will, in any case,

consult the original references for details of the work. The bibliographies are intended to apprise such a worker of the existence of such published information.

Because the Commission on High Temperatures and Refractories deals with a very wide field of activity, it has been found convenient to divide it into two Sub-Commissions. One deals with work on condensed systems; the other concerns itself with high-temperature work on gaseous systems.

Attempts have been made to obtain workers in the various scientifically active countries to undertake the task of preparing such lists of work and workers and the above-mentioned bibliographies. Those who have contracted to participate in this work up to the present time, with their respective areas of responsibility, are as follows:

Dr. Marc Foex, Secretary of the Sub-Commission on Condensed States, IUPAC.

Laboratoire de l'Energie Solaire,
MontLouis, Hautes Pyrénées, France,
who is responsible for the information
from France and Belgium, and whose
office acts as a general collection and
distribution agency on a world-wide basis.

Dr. J.J. Diamond - United States
Dr. Raymond F. Walker

National Bureau of Standards,
Washington, D.C.

Professor G. Hagg - Scandinavian countries
University of Uppsala,
Sweden.

Dr. Hisao Mii - Japan
Government Industrial
Research Institute,
Nagoya, Japan.

Professor F. Nowotny - Austria
Vienna, Austria.

Dr. R.L. Thakur - India
Central Glass and Ceramic
Research Institute,
Calcutta, India.

Dr. N.F.H. Bright - Canada
Mines Branch,
Department of Mines and
Technical Surveys,
Ottawa, Canada.

The information from the United Kingdom and
from the U.S.S.R. has hitherto been collected by Dr. M. Foex
from material made available by the Centre National de la Recherche
Scientifique in France. It is hoped to obtain representatives who
will serve for these two countries in the near future.

The Mines Branch, Department of Mines and
Technical Surveys, Ottawa, is one of the major centres of high-
temperature condensed-states research in Canada. It is therefore
logical that a member of that organization should assume responsibility
for collecting information in regard to Canadian work in this field,
and also that the Department should be associated with the
dissemination of other relevant information.

The arrangement that has been suggested as desirable
by the IUPAC is that quarterly bibliographies of relevant work should

be prepared and circulated to the various participating countries, leaving it up to the local representative to see that the information from his own and other countries is circulated within his country. The lists of laboratories active in the field would be circulated on a similar basis, but biennially rather than quarterly. This present Information Circular represents the first contribution prepared at the Mines Branch in order to satisfy the above commitments.

The information is listed under various headings, as follows:-

1. List of laboratories in Canada which are active in research and development work on condensed states at high temperature. This list is sub-divided into the following categories of work:-
 - a) Research on Fused Salts;
 - b) Research on Single Crystal Growth;
 - c) Research on High-Temperature Phase Equilibria;
 - d) Research on Kinetics of Solid State Reactions;
 - e) The Production of High Temperatures (above 1200°C);
 - f) The Measurement of High Temperatures (above 1200°C);
 - g) Research on the Physical Properties of Condensed Phases stable above 1000°C.

In each sub-division there is an addendum giving more recent information received subsequently to the compilation of the main lists.

2. Bibliography of work on high-temperature condensed states published in Canadian journals during each of the four quarters of 1959. These bibliographies, which were compiled by the author of this Information Circular, are each sub-divided into the following headings, depending on the type of work described:
 - a) Devices for achieving high temperatures;
 - b) Devices for measuring and controlling high temperatures;
 - c) Devices for physical measurements at high temperatures;
 - d) Properties of refractory phases and systems studied at lower temperatures:
 - (i) metallic systems,
 - (ii) non-metallic systems;
 - e) Properties and uses for refractory phases and systems at high temperatures:
 - (i) metallic systems,
 - (ii) non-metallic systems;
 - f) Properties of non-refractory phases and systems at high temperatures;
 - g) Phase equilibria;
 - h) Reactions (physical and chemical) at high temperatures.

This arrangement has been adopted in order to maintain uniformity with the format accepted by other countries for such sub-divisions; the scheme was originally suggested by Professor G. Hagg, of Uppsala, Sweden.

3. Bibliography of work published in France and Belgium

- a) for the quarter July, August, September, 1959;
- b) for the quarter October, November, December, 1959.

4. Bibliography of work published in India

- a) for the quarter July, August, September, 1959.

No information is yet available for the last quarter of 1959.

5. Bibliography of work published in Austria

- a) for the quarter July, August, September, 1959;
- b) for the quarter October, November, December, 1959.

6. Bibliography of work published in Scandinavia

- a) for the quarter July, August, September, 1959;
- b) for the Quarter October, November, December, 1959.

7. Bibliography of work published in the U.S.A.

- a) for the quarter July, August, September, 1959;
- b) for the quarter October, November, December, 1959.

8. Bibliography of work published in Great Britain

a) for the quarter October, November, December,
1959.

No information is available for any earlier period.

9. Bibliography of work published in the U.S.S.R.

a) for the quarter October, November, December,
1959.

No information is available for any earlier period.

It will be observed that certain of the above bibliographies are given in French and some in German. This is due to the fact that the information was supplied to the present author by representatives from the countries concerned, using those languages. It is not felt that any difficulty will be experienced by Canadian workers in the high-temperature field in understanding the nature of the work thus reported.

In studying the bibliographies, the reader should bear in mind that they are arranged according to the country in which the work was published, and not according to the country in which it was done. Thus, a Canadian worker publishing work in a Scandinavian journal such as Acta Crystallographica would find his work recorded in the Scandinavian bibliography, not in the Canadian. Conversely, an American writer publishing his work in a journal such as the Canadian Journal of Chemistry, would find it recorded in the bibliography for Canada, not in that for the U.S.A.

As is mentioned in the following section of this report, which gives details of Canadian work and workers in the high-temperature condensed states field, these lists are not considered to be exhaustive, either in regard to the establishments and workers listed or in regard to the bibliographic coverage. The author of this Information Circular would greatly appreciate being advised of any errors or omissions from these lists, so that corrective measures may be taken in subsequent quarterly issues.

PART II

PRELIMINARY LISTS OF LABORATORIES AND

WORKERS IN CANADA

active in

RESEARCH AND DEVELOPMENT WORK ON CONDENSED

STATES AT HIGH TEMPERATURES

The following lists have been compiled primarily from the survey forms returned to date by Canadian recipients known or thought to be interested in high temperature work, and to whom the questionnaires were sent. The lists are believed to be incomplete, and will be extended as additional information becomes available. Corrections or suggestions for the inclusion of additional names to any of these lists should be sent to the author of this Information Circular at the following address:-

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

The suggestions should, in general, be restricted to those active in research on condensed phases above 1000-1200°C. Any errors in or omissions from the bibliographies should also be reported to the author, who will have them rectified in a subsequent quarterly Information Circular.

International Union of Pure and Applied Chemistry
Commission on High Temperatures and Refractories
Sub-Commission on Condensed States

CANADIAN LABORATORIES
active in
RESEARCH ON FUSED SALTS

Name and Address of Institution	Personnel	Properties and Chemical Systems being Studied
Aluminium Laboratories Limited, P.O. Box No. 645, Arvida, Quebec.	N.W.F. Phillips E.A. Hollingshead J. Braunworth E.W. Dewing	Fluorides, chlorides, and oxides of aluminium, alkali metals and alkaline earth metals
Dominion Magnesium Limited, Haley, Ontario.	H.A. Timm A. Froats	Alkali metal and alkaline earth halides
Mines Branch, Dept. of Mines and Technical Surveys, 300 Lebreton Street, Ottawa, Ontario.	S.N. Flengas T.R. Ingraham	KCl/NaCl eutectic containing various chloride salts, e.g., Tl, Cu, Cr, Zn, Ni, Ti, etc.- to establish activities and an electrochemical series
National Research Council of Canada, Atlantic Regional Laboratory, Halifax, Nova Scotia.	C.R. Masson	E.M.F. measurements on molten slags containing ferrous oxide
Norton Company, P.O. Box No. 87, Niagara Falls, Ontario.	J.J. Scott D.W. Marshall E.A. Pett S.J. Roschuk	Al_2O_3 , ZrO_2 , MgO , other oxides and mixtures thereof
University of Manitoba, Department of Chemistry, Winnipeg, Manitoba.	A.N. Campbell E.M. Kartzmark	

Addendum - Fused Salt Work

Name and Address of Institution	Personnel	Chemical Systems being Studied
Department of Metallurgical Engineering, University of Toronto, Toronto, Ontario.	H.U. Ross A. Ohno	CaO-Al ₂ O ₃ -TiO ₂ -SiO ₂ slags.

International Union of Pure and Applied Chemistry
Commission on High Temperatures and Refractories
Sub-Commission on Condensed States

CANADIAN LABORATORIES

active in

RESEARCH ON SINGLE CRYSTAL GROWTH

Name and Address of Institution	Personnel	Chemical Systems Being Studied
Atomic Energy of Canada Limited, Chemistry and Metallurgy Division, Chalk River, Ontario.	J.R. MacEwan G.V. Kidson	Uranium Dioxide Zirconium Uranium
Dalhousie University, Chemistry Department, Halifax, Nova Scotia.	W.R. Trost J. Dauphinee	Ti, V, and Cr sub-group elements and alloys, using zone refining
Norton Company, P.O. Box No. 87, Niagara Falls, Ontario.	R.O. Tervo E.C. Lowe J. Karpinski R. Gerry F. Ciccarelli K. Vidmar D.T. Lapp	Silicon carbide
Nova Scotia Technical College, Department of Chemical Engineering, Halifax, Nova Scotia.	Osvald Knop (Mrs.) L. Castelliz (Miss) J.M. Osborne	Titanates, ferrites and related compounds
University of British Columbia, Department of Mining and Metallurgy, Vancouver, British Columbia.	E. Techtsoonian K.G. Davis	High purity cobalt
Mineral Sciences Division, Mines Branch, Dept. of Mines and Technical Surveys, 555 Booth Street, Ottawa, Ontario.	N.F.H. Bright M. Ibrahim A. Jongejan	Calcium niobates Iron-substituted gehlenites

Addendum - Single Crystal Work

Name and Address of Institution	Personnel	Chemical Systems being Studied
Canadian Armament Research and Development Establishment, P.O. Box No. 1427, Quebec, P.Q.	H.P. Tardif J. Higgins	Germanium Silicon

International Union of Pure and Applied Chemistry
Commission on High Temperatures and Refractories
Sub-Commission on Condensed States

CANADIAN LABORATORIES

active in

RESEARCH ON HIGH TEMPERATURE PHASE EQUILIBRIA

Name and Address of Institution	Personnel	Chemical Systems Being Studied
Canadian Refractories Limited, Research Department, Marelac, Quebec.	G.R. Rigby	Systems involved in chemical equilibria in chrome-magnesite and other refractory bricks
Dalhousie University, Chemistry Department, Halifax, Nova Scotia.	W.R. Trost Ian Gay Melvin Heit J. Dauphinee	1. A_2B and A_3B intermediates from transition elements. 2. Compounds of the formula $MO\cdot Al_2O_3\cdot SiO_2$ where M = Mn, Fe, Ca, Mg
National Research Council of Canada, Atlantic Regional Laboratory, Halifax, Nova Scotia.	C.R. Masson S.G. Whiteway J.P. Burden	1. Slag-metal equilibria in ferrous systems, including distribution of oxygen and phosphorus. 2. Gas-metal equilibria in ferrous systems, including distribution of oxygen and carbon between Fe and CO/CO ₂ gas mixtures
Norton Company, P.O. Box No. 87, Niagara Falls, Ontario.	L.J. Beaudin S.J. Roschuk P. van Loan S. Fernandes	ZrO ₂ , Al ₂ O ₃ and mixtures of these and other oxides
Nova Scotia Technical College, Department of Chemical Engineering, Halifax, Nova Scotia.	Osvald Knop (Mrs.) L. Castelliz (Miss) J.M. Osborne	Barium titanate with additiona

Name and Address of Institution	Personnel	Chemical Systems Being Studied
Quebec Iron and Titanium Corporation, P.Q. Box No. 40, Sorel, Quebec.	H. Lee B. Bernard	Titania slag and metallic iron containing carbon and minor impurities
Queen's University, Department of Metallurgical Engineering, Kingston, Ontario.	F.A. Hames	Alloy phase diagrams
Shawinigan Chemicals Limited, Plant Research Department, Shawinigan Falls, Quebec.	A.Y. Scobie	Calcium carbide - carbon - calcium oxide. Silica - iron oxide - ferrosilicon - silicon carbide
University of Alberta, Department of Mining and Metallurgy, Edmonton, Alberta.	J. Gordon Parr K.P. Singh G.R. Purdy D.R. Grekul J. Goldak	Titanium - nickel Titanium - aluminium Zinc - aluminium Zirconium - oxygen - hydrogen
University of British Columbia, Department of Mining and Metallurgy, Vancouver, British Columbia.	C.S. Samis W.G. Davenport J.W. Matousek	1. Activity of ZnO in CaO-FeO- SiO ₂ slags in contact with iron- saturated brass. 2. Thermodynamic properties of the Cu-Ni sulphide system
University of Manitoba, Department of Chemistry, Winnipeg, Manitoba.	A.N. Campbell E.M. Kartzmark W. Reynolds H. Hutton	1. Indium - gallium - silver 2. Lithium - sodium - potassium - sulphate - chloride
University of Manitoba, Department of Geology, Winnipeg, Manitoba.	H.D.B. Wilson D.T. Anderson	Partition ratios of Cu and Ni between sulphides and silicates at 1200 °C
Mines Branch, Mineral Sciences Division, Dept. of Mines and Technical Surveys, 555 Booth Street, Ottawa, Ontario.	(1) A.T. Prince N.F.H. Bright M. Ibrahim A. Jongejan A.H. Webster	1. a) Reactions occurring in the complex multi-oxide systems occurring in various types of commercial refractories. b) Lime-niobia-silica system c) MgO-TiO ₂ -SiO ₂ system d) Fe-Ti-O system e) 2CaO·SiO ₂ -Al ₂ O ₃ -Fe ₂ O ₃ system.

Name and Address of Institution	Personnel	Chemical Systems Being Studied
(cont'd) Mines Branch, Mineral Sciences Division, Dept. of Mines and Technical Surveys, 555 Booth Street, Ottawa, Ontario.	(2) G.H. Faye W.R. Inman	2. Fire assay research using SnO_2 as reducible constituent of slag or flux for collection of platinum group metals. Lead oxide used similarly for fire assaying of gold and silver

Addendum - Phase Equilibrium Work

Name and Address of Institution	Personnel	Chemical Systems being Studied
Department of Metallurgical Engineering, University of Toronto, Toronto, Ontario.	H. U. Ross A. Ohno A. W. Lund	Slag-metal equilibria Perovskite-like structures containing niobium
Canadian Refractories Limited, P.O. Box No. 160, Grenville, Quebec.	G. R. Rigby B. Hamilton	Cu_2O , CuO and spinels Cu_2O , CuO and MgO Na_2O and spinels K_2O and spinels Cr_2O_3 -CaO-MgO-SiO ₂ Fe_2O_3 -CaO-MgO-SiO ₂

International Union of Pure and Applied Chemistry
Commission on High Temperatures and Refractories
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CANADIAN LABORATORIES
active in
RESEARCH ON KINETICS OF SOLID STATE REACTIONS

Name and Address of Institution	Personnel	Processes or Chemical Systems being Studied
Aluminium Laboratories Limited, P.O. Box No. 645, Arvida, Quebec.	P.A. Puxley J.G. Lindsay	Al_2O_3 - SiO_2 reaction and variations
Atomic Energy of Canada Limited, Chemistry and Metallurgy Division, Chalk River, Ontario.	G.V. Kidson	Self-diffusion in zirconium and uranium
McMaster University, Hamilton, Ontario.	J.S. Kirkaldy	1. Application of thermo- dynamics of irreversible processes to the definition of the morphological features of growth in solid/solid and solid/liquid transformations. 2. Study of solid-state chemical diffusion in steels with applications to the description of phase transformations
National Research Council of Canada, Atlantic Regional Laboratory, Halifax, Nova Scotia.	S.G. Whiteway	Sintering of magnesium oxide powders
National Research Council of Canada, Applied Chemistry Division, Montreal Road, Ottawa, Ontario.	L.D. Calvert D. Caplan	Fe-Cr-O system; X-ray diffraction being used to study significance of this system in corrosion problems

Name and Address of Institution	Personnel	Processes or Chemical Systems being Studied
Quebec Iron and Titanium Corporation, P.O. Box No. 40, Sorel, Quebec.	H. Lee B. Bernard	Titania-containing minerals and slags reacting with reducing agents
University of Alberta, Department of Mining and Metallurgy, Edmonton, Alberta.	J. Gordon Parr G.R. Purdy D.R. Grekul	Titanium - nickel Zinc - aluminium
University of British Columbia, Department of Mining and Metallurgy, Vancouver, British Columbia.	W.M. Armstrong J.F. Clarke D.P.H. Hasselman M.L. De Cleene D.G.S. Evans	Interface reactions between:- Ni-Ti alloys and single crystals of Al_2O_3 . Similarly for Ni-Cr, Ni-V, and Ni-Zr alloys. Pure Ni and MgO Pure Co and MgO
Mineral Sciences Division, Mines Branch, Dept. of Mines and Technical Surveys, 555 Booth Street, Ottawa, Ontario.	G.G. Eichholz	Distribution of phosphorus between molten iron and slag at temperatures up to 1600°C, using P^{32} as a radiotracer

Addendum - Kinetic Work

Name and Address of Institution	Personnel	Processes or Chemical Systems being Studied
Canadian Armament Research and Development Establishment, P.O. Box No. 1427, Quebec, P.Q.	H.P. Tardif	Iron-carbon alloys
Department of Metallurgical Engineering, University of Toronto, Toronto, Ontario.	H.U. Ross J. Cox	Iron oxides
Canadian Refractories Limited, P.O. Box No. 160, Grenville, Quebec.	G.R. Rigby B. Hamilton T. Pinnacle R. Hulton	$\text{CaO}-\text{MgO}-\text{SiO}_2$ $\text{CaO}-\text{Fe}_2\text{O}_3-\text{SiO}_2$ $\text{Na}_2\text{O}-\text{V}_2\text{O}_5-\text{Al}_2\text{O}_3-\text{SiO}_2$

International Union of Pure and Applied Chemistry
Commission on High Temperatures and Refractories
Sub-Commission on Condensed States

CANADIAN LABORATORIES

active in

PRODUCTION OF HIGH TEMPERATURES ABOVE 1200°C

Name and Address of Institution	Personnel	Techniques being Used
Atomic Energy of Canada Limited, Chemistry and Metallurgy Division, Chalk River, Ontario.	J.R. MacEwan L.M. Pidgeon (contract work at University of Toronto)	Resistance heating of refractory metals
Canadian General Electric Company Ltd., Industrial Products Dept., Carboloy Section, 1199 Lansdowne Avenue, Toronto 4, Ontario.	W.R. Jackson C.A. Seger	Molybdenum resistance windings on $5\frac{1}{2}$ in. dia. Alundum muffler, to produce temperatures up to 1650°C
Defence Research Chemical Laboratories, Shirley Bay, Ottawa, Ontario.	H.R. Richards L.G. Wilson	Two solar furnaces producing radiation at rate of 200 cal./cm ² /sec.
Dominion Magnesium Limited, Haley, Ontario.	H.A. Timm D. Peplinski P. Gibbs	Electric resistance furnaces
National Research Council of Canada, Applied Physics Division, Sussex Drive, Ottawa, Ontario.	M.J. Laubitz	Inductive heating. Resistive heating using noble and refractory metals
National Research Council of Canada, Atlantic Regional Laboratory, Halifax, Nova Scotia.	C.R. Masson W.D. Jamieson S.G. Whiteway	Resistance furnaces with Pt/Rh, Mo, SiC, and C elements. Induction heating for levitation melting

Name and Address of Institution	Personnel	Techniques being Used
Norton Company, P.O. Box No. 87, Niagara Falls, Ontario.	G.R. Watson E.C. Lowe H.J. Bartlett B. Matchen	High frequency, arc, and resistance furnaces
Ontario Research Foundation, 43 Queen's Park, Toronto, Ontario.	R.L. Cavanaugh	Burning of oxygen and natural gas in specially- designed tunnel-type burner; flame temperature approx. 2500°C; used for jet smelting in direct reduction of iron ore
Quebec Iron and Titanium Corporation, P.O. Box No. 40, Sorel, Quebec.	H. Lee B. Bernard	Electric arc furnaces. Fuels with air or oxygen
Shawinigan Chemicals Limited, P.O. Box No. 330, Shawinigan Falls, Quebec.	H.S. Johnson	Electrically heated fluidized beds
University of British Columbia, Dept. of Mining and Metallurgy, Vancouver, British Columbia.	W.M. Armstrong	1. Small ceramic specimens heated to 1500-2000°C for measurement of contact angles of molten metal drops. 2. Induction heating using Mo susceptor in vacuum or inert gas atmosphere

Addendum - High Temperature Production Work

Name and Address of Institution	Personnel	Techniques Being Used
Department of Mechanical Engineering, Laval University, Boulevard de l' Entente, Quebec, P.Q.	J. Bonneville	Pre-heating with Globar elements. Further heating with high- frequency electric fields
Department of Mechanical Engineering, University of Toronto, Toronto, Ontario.	L.M. Pidgeon J. Meyer J. Byerly	Induction heating up to 2200°C. Resistance heating on small scale to 2800°C. Used in examining reactions of UO_2
Canadian Refractories Limited, P.O. Box No. 160, Grenville, Quebec.	H. Booth J. Perry	Furnaces fired with propane gas-air to 1800°C. Furnaces heated with electrical resistors to 1500°C.

International Union of Pure and Applied Chemistry
Commission on High Temperatures and Refractories
Sub-Commission on Condensed States

CANADIAN LABORATORIES

active in

RESEARCH ON MEASUREMENT OF HIGH TEMPERATURES
(above 1200°C)

Name and Address of Institution	Personnel	Remarks
Atomic Energy of Canada Limited, Chemistry and Metallurgy Division, Chalk River, Ontario.	W.H. Stevens A. Harvey	--
Dominion Magnesium Limited, Haley, Ontario.	H.A. Timm	In connection with work on the (MgO + Si) reaction
National Research Council of Canada, Applied Physics Division, Sussex Drive, Ottawa, Ontario.	M.D. Laubitz	--
Quebec Iron and Titanium Corporation, P.O. Box No. 40, Sorel, Quebec.	H. Lee B. Bernard	--

Addendum - High Temperature Measurement Work

Name and Address of Institution	Personnel	Remarks
Canadian Armament Research and Development Establishment, P.O. Box No. 1427, Quebec, P.Q.	R.C. Maiden J. Charest	Measurement of infra-red and visible radiations during ablation of high velocity projectiles.
	M. Letarte	Measurement of stagnation temperatures at the front of high velocity projectiles.
Department of Metallurgical Engineering, University of Toronto, Toronto, Ontario.	L.M. Pidgeon J. Byerly	Compatibility of metallic thermocouples with UO_2 systems
Canadian Refractories Limited, P.O. Box No. 160, Grenville, Quebec.	J. Perry H. Booth	Interested in temperature control and recording

International Union of Pure and Applied Chemistry
Commission on High Temperatures and Refractories
Sub-Commission on Condensed States

CANADIAN LABORATORIES

active in

RESEARCH ON PHYSICAL PROPERTIES OF CONDENSED
STATES STABLE ABOVE 1000°C

Name and Address of Institution	Personnel	Chemical Systems being Studied
Aluminium Laboratories Limited, P.O. Box No. 645, Arvida, Quebec.	N.W.F. Phillips F.W. Southam	Confidential
Atomic Energy of Canada Limited, Chemistry and Metallurgy Division, Chalk River, Ontario.	J.R. MacEwan J.A.L. Robertson L.M. Pidgeon (contract work at University of Toronto) G.H. Chalder W.H. Stevens	Grain growth character- istics. Thermal conduct- ivity. Volume change on freezing and compatibility with refractory metals. Sintering. Diffusion of Xenon - all in relation to uranium dioxide
Carleton University, Chemistry Department, Ottawa, Ontario.	D.R. Wiles	Szilard-Chalmers recoil reactions with radioactive tracers in inorganic solids - involves study of heat flow, diffusion, annealing and high-temperature thermo- dynamics
Carleton University, Physics Department, Ottawa, Ontario.	John Hart	Electrical conductivity, dielectric constant and thermal conductivity of ceramics
McMaster University, Dept. of Metallurgy and Metallurgical Engineering, Hamilton, Ontario.	W.W. Smeltzer	Oxidation and surface properties of metals such as Zr and stainless steels

Name and Address of Institution	Personnel	Chemical Systems being Studied
National Research Council of Canada, Applied Physics Division, Sussex Drive, Ottawa, Ontario.	M.J. Laubitz	Thermal conductivity, diffusivity, electrical conductivity and thermo- electric power in refractory ceramics
Norton Company, P.O. Box No. 87, Niagara Falls, Ontario.	G.R. Watson B. Matchen W.H. Weldon D.T. Lapp	Electrical and thermal conductivity, and strength in bending of SiC, B_4C , $MoSi_2$, mixed borides; carbides, nitrides and borides in general
University of British Columbia, Dept. of Mining and Metallurgy, Vancouver, British Columbia.	W.M. Armstrong D.P.H. Hasselman	Plastic deformation, dislocation density and other point defects in single crystals of MgO

Addendum - Physical Properties Work

Name and Address of Institution	Personnel	Chemical Systems being Studied
Department of Metallurgical Engineering, University of Toronto, Toronto, Ontario.	L.M. Pidgeon J. Harrington A. Greeniras	Vapour pressure of metals and alloys. Reaction pressures of Mg, Ca, and Ti over various oxide/metal systems.
Canadian Refractories Limited, P.O. Box No. 160, Grenville, Quebec.	L.R. Davies J. Perry H. McLean	Modulus of elasticity up to 1400°C. Modulus of rupture up to 1400°C. Creep above 1000°C. System under study:- $MgO-CaO-SiO_2$ MgO and spinels.

PART III

BIBLIOGRAPHIES OF PUBLISHED WORK ON
HIGH TEMPERATURE CONDENSED STATES,
FOR CANADA AND ELSEWHERE, 1959

Commission on High Temperature
of the
International Union of Pure and Applied Chemistry
(Sub-Commission on Condensed States)

Bibliography (January, February, March, 1959)
for Canada

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Commission on High Temperatures

of the

International Union of Pure and Applied Chemistry
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