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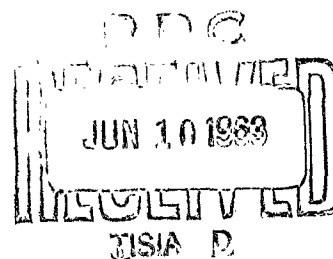
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Preface

The following bibliography is arranged in chronological order by years. For a given year, the articles are alphabetized by first author's last name. The information given is authors, title of paper and reference.

This far infrared bibliography includes papers which deal primarily with infrared spectroscopy between 25 and 1000 μ . There are papers dealing with various aspects of instrumentation which are necessary in the far infrared spectral region. There are papers describing the use of far infrared radiation for studying many kinds of physical phenomena, such as vibration-rotation bands and rotation bands of gases, vibration bands of liquids and solids, optical constants of solids, impurity spectra of semiconductors, cyclotron resonance in solids, properties of superconductors, etc. Some papers which describe techniques that have eventually found widespread use in far infrared spectroscopy are included for historical interest. Some papers describe studies using optical techniques which overlap into the microwave region. The investigations described in some papers covered both the near and far infrared. Since 25 μ is a somewhat arbitrary dividing line, it is difficult to omit these papers. A few dissertations, abstracts and final progress reports are included because they often contain useful information not published elsewhere. Also, a few books are cited.

For historical interest, an attempt has been made to include all the papers of Rubens. His work progressed naturally from the near infrared to the far infrared.

A list of the journal abbreviations used are given. There are cross reference sections by author and by subject matter.

There is one graph illustrating the growth of research in the far infrared spectral region.

Several bibliographies in books and articles have proved helpful. Among these are: "Infrared Spectroscopy", by P.B. Barnes, R.C. Gore, U. Liddel and V.Z. Williams, Reinhold Publishing Corp., New York, 1944; Infrared, a bibliography, Part I by C.R. Brown, M.W. Ayton, T.C. Goodwin, and T.J. Derby, The Library of Congress, Technical Information Division, Washington, D.C., 1957; "Analytical Applications of Far Infrared Spectra. I. Historical Review, Apparatus and Techniques", by F.F. Gentley, E.F. Wolfarth, N. Srp and W.R. Powell, Spectrochim. Acta, 13:1, 1958; Biographisch-literarisches Handwörterbuch der Exakten Naturwissenschaften, vol. VIIa, Suppl., J.C. Poggendorff, Akademie - Verlag, Berlin, 1960.

I would like to express my appreciation to several people who helped in the information and growth of this bibliography since its start in 1954 at the Ohio State University. They are R.A. Oetjen, E.E. Bell, H. Yoshinaga, R. Rowntree, M. Hass, L. Genzel.

JOURNAL ABBREVIATIONS

- Acta Physicochim. URSS - Acta Physicochimica URSS
 Amer. J. Phys. - American Journal of Physics
 Amer. J. Sci. - American Journal of Science
 Amer. Phys. Teach. - American Physics Teacher
 Ann. Physik - Annalen der Physik
 Ann. Chim. Phys. - Annales de Chimie et de Physique
 Ann. Phys. Paris - Annales de Physique Paris
 Appl. Opt. - Applied Optics
 Astrophys. J. - Astrophysical Journal

 Cah. Phys. - Cahiers de Physique
 Compt. Rend. - Comptes Rendus
 Compt. Rend. Acad. Sci. URSS - Comptes Rendus de L'Academie des Sciences de l'URSS
 Cryogenics

 Disc. Far. Soc. - Discussions of the Faraday Society
 Dokl. Akad. Nauk - Doklady Akademi Nauk (Sov. Phys. Dokl. - Soviet Physics Doklady)

 The Electrician
 Electrotech. Z. - Elektrotechnische Zeitschrift
 Ergebn. Exakt. Naturwiss. - Ergebnisse der Exakten Naturwissenschaften

 Geiger - Sheels Handbuch der Physik

 Infrared Phys. - Infrared Physics
 Int. Conf. Spect. 7th Liege 1958 Proc. International Conference on Spectroscopy 7th, Liege 1958 Proceedings
 Inzh. - Fiz. Zhur. - Inzhenerno Fizicheskiy Zhurnal
 Izvest. Akad. Nauk - Izvestiya Akademi Nauk (Bull. Acad. Sci. - Bulletin of the Academy of Sciences USSR)

 Jahr. Radioak. Elekt. - Jahrbuch der Radioaktivitat und Elektronik
 Japan J. Appl. Phys. - Japan Journal of Applied Physics
 J. Amer. Chem. Soc. - Journal of the American Chemical Society
 J. Chem. Educ. - Journal of Chemical Education
 J. Chem. Phys. - Journal of Chemical Physics

 J. Mol. Spect. - Journal of Molecular Spectroscopy
 J. Opt. Soc. Amer. - Journal of the Optical Society of America
 J. Phys. Chem. - Journal of Physical Chemistry
 J. Phys. Soc. Japan - Journal of the Physical Society of Japan
 J. Phys. Chem. Solids - Journal of the Physics and Chemistry of Solids
 J. Phys. Rad. - Journal de Physique et le Radium
 J. Phys. Theor. Appl. - Journal de Physique Theorique et Appliquee
 J. Quant. Spect. Rad. Transfer - Journal of Quantitative Spectroscopy and Radiative Transfer
 J. Res. Natl. Bur. Stand. - Journal of Research of the National Bureau of Standards
 J. Sci. Instr. - Journal of Scientific Instruments

 Nature
 Naturwiss. - Naturwissenschaften
 Naturw. Rdsch. - Naturwissenschaftliche Rundschau
 Nernstfestschrift
 Nuovo Cimento Suppl. - Nuovo Cimento Supplemento

 Optica Acta
 Optik
 Opt. i Spektr. - Optika i Spektroskopia (Optics and Spectroscopy)

 Phil. Mag. - Philosophical Magazine
 Physica
 Phys. Rev. - Physical Review
 Phys. Rev. Letters - Physical Review Letters
 Phys. Z. - Physikalische Zeitschrift
 Phys. Z. Sowjetunion - Physikalische Zeitschrift der Sowjetunion
 Proc. Natl. Acad. Sci. - Proceedings of the National Academy of Sciences
 Proc. Phys. Soc. (London) - Proceedings of the Physical Society (London)
 Proc. Roy. Soc. (London) - Proceedings of the Royal Society (London)

 Quar. J. Roy. Meteorol. Soc. - Quarterly Journal of the Royal Meteorological Society

 Le Radium

Rapport du Congrès International de
Physique
Repts. Progr. Phys. - Reports of Progress
in Physics
Rev. Sci.Instr. - Review of Scientific
Instruments
Rev. Phys.Chem. Japan - Review of
Physical Chemistry, Japan
Revs. Mod. Phys. - Reviews of Modern
Physics
Rev. Opt. - Revue d'Optique
Rev.Gen.Sci.Pur.Appl. - Revue Generale
des Sciences Pures et Appliquees

Sci. Light (Japan) - Science of Light
Sci. Repts. - Tohoku Univ. - The Science
Reports of the Research Institutes,
Tohoku University -
Séances Soc. Franc.Phys. - Séances de la
Societe Francaise de Physique
SERL Tech. J. - SERL Technical Journal
Berl. Ber. - Sitzungsberichte der
Koniglich Preussischen Akademie der
Wissenschaften zu Berlin
Smith. Rept. - Smithsonian Annual Report
Spectrochim. Acta - Spectrochimica Acta

Trans. Far.Soc. - Transactions of the
Faraday Society

Uspekhi Fiz. Nauk - Uspekhi Fizicheskikh
Nauk (Prog. Phys.Sci.USSR - Progress
in Physical Sciences USSR)

Verh.Deut.Phys.Ges. - Verhandlungen die
Deutsche Physikalische Gesellschaft
Verh.Ges. D. Naturf. Ärzte - Verhandlungen
der Gesellschaft Deutscher
Naturforscher und Ärzte

Wied. Ann. - Wiedemann Annalen der
Physik und Chemie

Z. Angew. Physik - Zeitschrift für
Angewandte Physik
Z. Elektrochem. - Zeitschrift für
Elektrochemie und Angewandte
Physikalische Chemie
Z. Instr. - Zeitschrift für
Instrumentenkunde
Z. Naturforsch. - Zeitschrift für
Naturforschung
Z. Physik - Zeitschrift für Physik
Z. Phys. Chem. Unterr. - Zeitschrift für
Physikalischen und Chemischen
Unterricht
Zhur. Eksp. i Teoret. Fiz. - Zhurnal
Eksperimental noi i Teoreticheskoi
Fiziki (J.Exp.Theor.Phys.USSR -

Journal of Experimental and Theoretical
Physics USSR)

IBM J. Res. Developm. - IBM Journal of
Research and Development

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This index is divided into general subjects, which, in turn are subdivided in some detail. The general subjects are: I. Review papers and books, II. Instrumentation and techniques, III. Optical properties of gases, IV. Optical properties of liquids, V. Optical properties of solids, VI. Miscellaneous.

To avoid the work involved in thoroughly indexing this bibliography, the subject information contained here was obtained primarily from the title of the paper. Therefore, the section entitled spectrometers contains references to some of the more obvious works, although many papers contain descriptions of spectrometers. Also, there were some problems assigning a paper to a subject, especially in section V. Optical properties of solids, where, for example, a paper on lattice vibrations of alkali halides may be found under lattice vibrations, reststrohlen, dispersion or transmission.

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 Ethyl alcohol- $\text{C}_2\text{H}_5\text{O}$ - 117
 α , β picoline- $\text{C}_6\text{H}_4\text{NCH}_3$ - 253

b. Various compounds - 53, 158, 254, 389

c. Polar, non-polar liquids - 254, 258, 261, 267

V. Optical Properties of Solids:

1. Reststrahlen

a. General - 68, 189, 205, 232, 233, 305, 399, 425, 592

b. Specific compounds:

Lithium fluoride- LiF - 198, 228, 269, 422, 473, 477, 541
 Sodium fluoride- NaF - 220, 228, 269, 477, 594, 637
 Sodium chloride- NaCl - 50, 52, 54, 56, 112, 125, 126, 127, 150, 168, 205, 218, 222, 228, 234, 241, 518, 545, 547, 592, 594, 637
 Sodium bromide- NaBr - 228
 Sodium iodide- NaI - 228

- Potassium chloride-KCl - 40, 41, 50, 54, 56, 125, 126, 127, 150, 205, 222, 228, 241, 244, 518, 547, 637
- Potassium bromide-KBr - 125, 126, 127, 228, 244, 518, 637
- Potassium iodide-KI - 125, 126, 127, 228
- Rubidium chloride-RbCl - 198, 228
- Rubidium bromide-RbBr - 228
- Rubidium iodide-RbI - 228
- Cesium chloride-CsCl - 228
- Cesium bromide-CsBr - 228, 388, 637
- Cesium iodide-CsI - 482, 637
- Thallium fluoride-TlF - 220, 228
- Thallium chloride-TlCl - 157, 228, 388, 414, 594, 637
- Thallium bromide-TlBr - 157, 388, 637
- Thallium iodide-TlI - 157, 388
- Krystall, Synthetisch no. 5-KRS-5 - 313, 594, 637
- Krystall, Synthetisch no. 6-KRS-6 - 313, 637
- Magnesium oxide-MgO - 243
- Silver Chloride-AgCl - 150
- Silver bromide-AgBr - 150
- Gallium phosphide-GaP - 547, 629
- Indium phosphide-InP - 480, 519, 629
- Gallium arsenide-GaAs - 519, 570, 629
- Indium arsenide-InAs - 519, 629
- Aluminum antimonide-AlSb - 519, 629
- Gallium antimonide-GaSb - 519
- Indium antimonide-InSb - 414, 440, 629
- Lead sulfide-PbS - 388, 414
- Lead selenide-PbSe - 414
- Zinc oxide-ZnO - 502
- Zinc sulfide-ZnS - 388, 414
- Cadmium telluride-CdTe - 591
- Calcium fluoride-CaF₂ - 58, 81, 212, 581, 633, 637
- Strontium fluoride-SrF₂ - 220, 633
- Barium fluoride-BaF₂ - 220, 633
- Lead chloride-PbCl₂ - 388
- Calcium carbonate-CaCO₃ - 136, 390
- Barium carbonate-BaCO₃ - 112
- Strontium carbonate-SrCO₃ - 112
- Ammonium chloride-NH₄Cl - 112, 157
- Ammonium bromide-NH₄Br - 157
- Mixed alkali halides - 207
- Quartz-SiO₂ - 40, 41, 42, 81
- Metal hydrates - 296
- c. Various compounds - 42, 43, 226
- 2. Lattice vibrations:
 - a. General - 232, 233, 399, 592
 - b. Specific compounds:
 - Lithium fluoride-LiF - 620
 - Sodium chloride-NaCl - 228, 546, 563
 - Sodium bromide-NaBr - 228, 563
 - Sodium Iodide-NaI - 228, 563
 - Potassium chloride-KCl - 228, 546, 563
 - Potassium bromide-KBr - 228, 563
 - Potassium iodide-KI - 228, 563
 - Rubidium chloride-RbCl - 563
 - Rubidium bromide-RbBr - 563
 - Rubidium iodide-RbI - 563
 - Cesium chloride-CsCl - 563
 - Cesium bromide-CsBr - 563

Thallium chloride-TlCl - 563
 Thallium bromide-TlBr - 563
 Thallium iodide-TlI - 563
 Silver chloride-AgCl - 563
 Silver bromide-AgBr - 563
 Indium antimonide-InSb - 537
 Gallium arsenide-GaAs - 570
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 Zinc sulfide-ZnS - 478
 Zinc selenide-ZnSe - 478
 Zinc telluride-ZnTe - 478
 Cadmium sulfide-CdS - 478, 617
 Cadmium selenide-CdSe - 478
 Cadmium telluride-CdTe - 478
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 KH di(p'-nitrobenzoate) - 575
 Potassium ferrocyanide-K₄[Fe(CN)₆].3H₂O - 586
 Mercurous chloride-Hg₂Cl₂ - 574
 Potassium dihydrogen phosphate-KH₂PO₄ - 575
 Rubidium dihydrogen phosphate-RbH₂PO₄ - 575
 Potassium dihydrogen arsenate-KH₂AsO₄ - 575

3. Dispersion:

- a. General - 26, 27, 28, 30, 159, 189, 205, 305, 528, 565
- b. Specific compounds:
 - Lithium fluoride-LiF - 422, 473, 477, 528, 620
 - Sodium fluoride-NaF - 477
 - Sodium chloride-NaCl - 17, 18, 22, 45, 56, 113, 205, 212, 234, 511, 528, 592; 621
 - Potassium chloride-KCl - 18, 22, 45, 56, 113, 205, 511
 - Potassium bromide-KBr - 235, 511
 - Potassium iodide-KI - 235
 - Krystall, Synthetisch no. 5-KRS-5 - 313, 325
 - Cesium bromide-CsBr - 528, 626
 - Calcium fluoride-CaF₂ - 18, 22, 25, 581, 626
 - Glasses - 17
 - Metals - 4, 5, 15
- c. Various compounds - 166

4. Transmission, optical constants, physical properties:

- a. Specific compounds:
 - Lithium fluoride-LiF - 328, 422, 473, 477
 - Sodium fluoride-NaF - 477
 - Sodium chloride-NaCl - 33, 45, 212, 328, 544, 546, 554, 592
 - Potassium chloride-KCl - 33, 45, 198, 244, 316, 546, 554
 - Potassium bromide-KBr - 244, 328, 544, 554
 - Potassium iodide-KI - 544
 - Cesium bromide-CsBr - 334, 335, 346, 554
 - Cesium iodide-CsI - 348, 355, 482, 554, 625

- Thallium chloride-TlCl - 316
- Thallium bromide-TlBr - 316
- Krystall synthetisch no. 5-KRS-5 - 309, 313, 316, 325, 335, 554
- Calcium fluoride-CaF₂ - 35, 58, 581
- Lead chloride-PbCl₂ - 316
- Silver chloride-AgCl - 309
- Germanium-Ge - 341, 402, 542, 625
- Silicon-Si - 341, 457, 542
- Tellurium-Te - 501
- Selenium-Se - 501
- Sulfur-S - 227
- Indium antimonide-InSb - 396, 411, 440, 537
- Gallium arsenide-GaAs - 570
- Aluminum oxide-Al₂O₃ - 628
- Beryllium oxide-BeO - 618
- Titanates-Ba, Sr, Pb, Ca, Cd, Mg, Zn(BaTiO₃, etc.) - 446, 631
- Quartz - 35, 37, 38, 125, 150, 227, 240, 279, 328, 539, 542, 572, 601, 625, 645
- Sapphire - 588, 645
- Ferrites - 412, 479
- Blacks - 227, 302, 317, 362, 579, 580
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- Mica - 227, 328
- Paraffin - 227, 240, 328
- b. Various compounds - 42, 43, 226
- 5. Reflection, optical constants:
 - a. Specific compounds:
 - Germanium-Ge - 321, 414
 - Silicon-Si - 414
 - Aluminum oxide-Al₂O₃ - 628
 - Beryllium oxide-BeO - 618
 - Titanates-Ba, Sr, Ca, Mg(BaTiO₃, etc.) - 363, 601, 613
 - Metals - 2, 4, 5, 36, 47, 57, 62, 67, 70, 71, 74, 75, 78, 79, 80, 85, 87, 88, 90, 96, 155, 176, 177, 223, 579, 580
 - Ice - 129
 - Blacks - 302, 362, 579, 584
 - Ferrites - 412
 - Lunar - 410, 641
 - Plastics - 302
 - b. Various compounds - 160, 226, 460
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- 7. Semiconductors:
 - a. Impurity spectra - 357, 417, 434, 436, 474, 475, 476, 506, 507, 548
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Lead-Pb - 424, 438, 443, 485, 512, 556, 623

Tin-Sn - 443, 456, 485, 556, 603

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Tantalum-Ta - 556, 623

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Manganese oxide-MnO - 583

Ferrous fluoride-FeF₂ - 593, 647

Ytterbium iron garnet - 605, 647

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a. Cyclotron resonance

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Indium arsenide-InAs - 553, 597, 598

Indium phosphorus-InP - 553, 597, 598

Gallium arsenide-GaAs - 596, 597

Bismuth-Bi - 463, 531

b. Impurity effects

Germanium-Ge - 442, 497, 507

c. Magneto plasma effects

Indium antimonide-InSb - 550

Bismuth-Bi - 463, 531

Cd_xH_{1-x}Te - 577

d. Band edge

Bismuth-Bi - 498

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Growth of Far Infrared Research

On the following page is presented a bar graph depicting the growth of far infrared research as indicated by the papers in this bibliography. The papers before 1920 are predominately the work of Rubens and coworkers. The papers before 1900 do not contain much far infrared work, but are included in the bibliography for historical interest. Consequently, the graph is deceptive before 1900.

