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Equilibrium Critical Phenomena In Fluids and Mixtures: A Comprehensive Bibliography With Key-Word Descriptors

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Equilibrium Critical Phenomena In Fluids and Mixtures: A Comprehensive Bibliography With Key-Word Descriptors

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Contents

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Equilibrium Critical Phenomena in Fluids and Mixtures:

A Comprehensive Bibliography with Key-Word Descriptors

Stella Michaels*, Melville S. Green*, and Sigurd Y. Larsen*

This bibliography of 1088 citations comprehensively covers relevant research conducted throughout the world between January 1, 1950 through December 31, 1967. Each entry is characterized by specific key word descriptors, of which there are approximately 1500, and is indexed both by subject and by author. In the case of foreign language publications, effort was made to find translations which are also cited.

Key words: Binary liquid mixtures; critical opalescence; critical phenomena; critical point; critical region; equilibrium critical phenomena; gases; liquid-vapor systems; liquids; phase transitions; ternary liquid mixtures; thermodynamics

1. Introduction

This bibliographical project was begun as an experiment in connection with the renewed research interest in the rather old subject of critical phenomena. Ever since its discovery in carbon dioxide by Thomas Andrews (1863)*, the phenomena in the neighborhood of the critical point of liquid-vapor transition and other analogous phenomena have given rise to numerous experimental investigations of greater or lesser permanent value.

The motivation of the project was to search out this vast literature in order that those papers of more than ephemeral interest would be available to the scientific community. Originally, the bibliography was intended to include the general field of second-order phase transitions as well as critical phenomena in the stricter sense and was to be divided into two parts - an historical part covering the period prior to 1950, and a modern part covering 1950 onward. It was quickly decided to defer the historical part and to limit the present bibliography to critical phenomena in a stricter sense.

The bibliography is intended to include all studies of equilibrium properties of the critical point of liquid-vapor systems and of binary and ternary liquid mixtures. Excluded

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* At the time of compilation of this material, Mrs. Michaels was a member of the Bibliography and Translation Unit, National Bureau of Standards Library; Dr. Green was Chief, Statistical Physics Section, Heat Division, Institute for Basic Standards; and Dr. Larsen was a member of the Statistical Physics Section, Heat Division. The present address for Mrs. Michaels is the Center for Computer Sciences and Technology, National Bureau of Standards, Washington, D.C. 20234, and for Dr. Green and Dr. Larsen, Temple University, Philadelphia, Pennsylvania 19122.

were general studies which included the critical region but did not make a special study of it, simple measurement of critical constants, and compilations of data. The time period covered is from January 1, 1950 through December 31, 1967. Studies published in all major scientific languages except Chinese, in which adequate sources of information were available to us, were surveyed.

Each paper was analyzed and was associated with a number of key word descriptors with a primary division as to type of research, i.e., experimental, theoretical, or analytical being made first. Another primary categorization was made according to the type of system, namely, liquid-vapor and binary or ternary liquid mixtures. Other descriptors included property measured, theoretical method used, and the chemical name of the substance measured. Approximately 1500 distinct descriptors were used to describe the papers. Each paper is characterized by roughly seven to ten descriptors. A subject index is also included through which all papers described by a given key word can be identified.

All entries are cited in English. In the case of foreign language papers, the original language is noted in brackets. Whenever possible, translations of foreign language documents are also cited.

Authors' names appear in the citations as they were published in the original paper - initials in one case - full name in the next. But, all authors' names have been standardized in the author index.

In order to assure comprehensive coverage, not only were the major abstracting services used, but also systematic searches of selected publications were made. Listings of both appear elsewhere in this manuscript. The standard for abbreviations was that of the American Chemical Society and a list of these abbreviations is provided.

Here we take the opportunity to thank those individuals who were so helpful to us during the compilation of this bibliography. Miss Sarah Anne Jones, retired Chief of the Bureau Library in which large portions of our studies were made; Mr. William Sartain, Chief, Stack and Reader Division, Library of Congress, who made that vast and valuable collection accessible to us; Dr. Raymond Mountain, Chief, Statistical Physics Section, NBS, for his generous assistance; Mrs. Patricia Jacobs and Miss Nancye E. McBryde who typed the manuscript; and Miss Stella Gross who willingly handled the difficult task of putting the subject index together.

*For details on Andrews' experiments see Miller's Chemical Physics, 1863, third edition and also Philosophical Transactions of the Royal Society, Vol. 159, Part II, (1869) pp. 575-590. For claims that the phenomena were discovered by D.I. Mendeléeff prior to 1863, see Annalen der Physik, 217, (1870) 618-626.

2. Bibliography

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Refractive index and Lorentz-Lorenz function for saturated argon, methane and carbon tetrafluoride.
J. Chem. Phys. 42, 4145-8 (1965).

Experimental; liquid-vapor; argon; methane; carbon tetrafluoride; Clausius-Mossotti relation; Lorentz-Lorenz function; index of refraction; critical point; critical temperature

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Treatment of liquid-liquid phase equilibriums. Hydrocarbon-perfluorocarbon mixtures.
J. Am. Chem. Soc. 88, 2887-93 (1966).

Experimental; hexane-perfluorohexane; n-heptane-perfluro-n-heptane; methylcyclohexane-perfluoro-methylcyclohexane; binary liquid mixtures; critical solution temperature, upper; methane-carbon tetrafluoride

3. Abe, R.
Logarithmic singularity of specific heat near the transition point in the Ising model.
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Theoretical; statistical mechanics; phase transition; liquid-gas; critical point; logarithmic singularity

4. Abe, Ryuzo.
Singularity of specific heat in the second order phase transition.
Progr. Theor. Phys. (Kyoto) 38, 322-31 (1967).

Theoretical; statistical mechanics; phase transition; logarithmic singularity; canonical partition function; Yang-Lee theory; heat capacity, C_v; critical point

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The vapor pressure, critical point, heat of vaporization, and entropy of liquid He^3.
Phys. Rev. 80, 366-71 (1950).

Experimental; $helium^3$; vapor pressure; heat of vaporization; entropy; critical point

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On the thermodynamics of solutions. IX. Critical properties of mixtures and the equation of Benedict, Webb and Rubin.
J. Chem. Phys. 38, 2740-2 (1963).

Analytical; critical constants; gaseous mixtures; ethane-nitrogen; methane-ethane; methane-heptane; propane-benzene; ethane-propane; methane-decane; carbon dioxide-sulfur dioxide; equation of state

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Efficiency of equations of state for gaseous mixtures at the critical locus. I. Application of the equation of Benedict, Webb and Rubin. II. Further improvements of an equation of state.
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Analytical; equation of state; critical region

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The dielectric constant of water at high temperatures and in equilibrium with its vapor.
J. Am. Chem. Soc. 72, 2844-7 (1950).

Experimental; liquid-vapor; water; dielectric constant; critical point

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Dielectric properties of solutions in a super high frequency field and concentration fluctuations. [Russian].
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Observation of time-dependent concentration fluctuations in a binary mixture near the critical temperature using a He-Ne laser.
Phys. Rev. Letters 14, 486-8 (1965).

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Physics of Quantum Electronics, San Juan, Puerto Rico, June 1965. New York, McGraw-Hill, 1966, pp. 253-9.

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Time-dependent concentration fluctuations near the critical temperature.
Critical Phenomena. Proc. Conf., Washington, D. C., April 1965. Natl. Bur. Std. Misc. Publ. 273, 157-60 (1966).

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Analytical; critical temperature; liquid-vapor; corresponding states

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The critical temperatures of forty organic compounds.
Trans. Faraday Soc. 56, 1452-9 (1960).

Experimental; critical temperature; n-pentane; 2-methylbutane; n-hexane; 2-methylpentane; 2,2-dimethylbutane; 2,3-dimethylbutane; n-heptane; 2-methylhexane; n-octane; 2-methylheptane; 2,2,4-trimethylpentane; n-nonane; n-decane; cis-butene-2 trans-butene-2; pentene-1; hexene-1; methylcyclopentane; methylcyclohexene; benzene; toluene; ethylbenzene; n-propylbenzene; 1,2,3-trimethylbenzene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; isobutylbenzene; fluorobenzene; naphthalene; 2,5-lutidine; 3,5-lutidine; n-undecane; n-dodecane; heptene-1; octene-1; cyclohexene; n-butylbenzene; 1-methylnaphthalene; 2,3-lutidine, 3,4-lutidine

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Phase transitions of the second kind and critical phenomena. V. Maximum specific heat on the critical layer formation of two-component liquid systems. [Russian].
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Experimental; liquid-vapor; ethanol; critical point; heat capacity, C_v; van der Waals equation of state

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The heat capacity C_v of water and water vapor in phase transitions, and hypercritical parameters. [Russian].
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Experimental investigation of the heat capacity C_v of water and water vapor at super-critical parameters of state. [Russian].
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Experimental; liquid-vapor; water; heat capacity, C_v; critical isobar; critical point

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The heat capacity of water at constant volume of the liquid and vapor phase in the single and two-phase regions on each side of the critical point. [Russian].
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Experimental; liquid-vapor; water; heat capacity, C_v; coexistence curve; gravity effect; critical isotherm; critical point

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Specific heat C_v of water and water vapor at super-critical [values of the thermodynamic] parameters of state. [Russian].
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Phase relationships in the pyridine series. Part I. The miscibility of some pyridine homologues with water.
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Light scattering at the critical point for the formation of two layers in a binary liquid system. [Russian].
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On experimental difficulties in obtaining the pressure-volume isothermals in critical regions.
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Methods and results of measurements of the dielectric parameters of binary liquid mixtures near the critical solution temperature. [Russian].
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Critical phenomena in the cyclohexane-aniline system.
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Theoretical; liquid-vapor; argon; oxygen; logarithmic singularity; heat capacity, C_v free energy; critical point

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Light scattering in the critical region. II. Ethane.
J. Chem. Phys. 18, 655-6 (1950).

Experimental; liquid-vapor; ethane; light scattering; critical point; interaction range

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Light scattering near the critical solution temperature.
Dissertation. Univ. Illinois. (1951).

Experimental; binary liquid mixtures; methanol-isopentane; methanol-n-pentane; methanol-n-hexane; critical solution temperature; light scattering; Einstein-Smoluchowski theory; Ornstein-Zernike theory; fugacity isotherm; critical opalescence

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Analytical; REVIEW; thermodynamics; critical phenomena; liquid-vapor; benzene; carbon dioxide; water; helium^3; n-hexane;

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Analytical; critical opalescence; isotherms; coexistence curve; REVIEW

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Analytical; critical phenomena; equation of state; REVIEW

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Theoretical; binary liquid mixtures; critical solution temperature, lower, upper; nicotine-water; coexistence curve; free energy

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Theoretical; phase transition

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Inelastic neutron scattering by density fluctuations in CO_2 near the critical point.
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Theoretical; statistical mechanics; phase transition ; lattice gas

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Analytical; equation of state; heat capacity, C_v, C_p; liquid-vapor; isotherm; isochore; critical point

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Experimental; liquid-vapor; binary liquid mixtures; ethane; methane-propane; critical point; index of refraction; light scattering; isothermal compressibility; turbidity; Einstein-Smoluchowski theory; Ornstein-Zernike theory; Lorentz-Lorenz law; coefficient of expansion

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Experimental; binary mixtures; ethane-heptane; retrograde condensation; liquid-vapor; van der Waals equation of state; critical phenomena

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Theoretical; liquid-vapor; intermolecular potential; van der Waals theory; critical density; critical fluctuations; Perkus-Yevick theory

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Theoretical; liquid-vapor; water; polytropic theory

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Theoretical; significant structure theory; entropy; vapor pressure; critical point

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Experimental; binary liquid mixtures;
chlorotryfluoromethane; critical region

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Experimental; helium, logarithmic singularity;
sound velocity; stirring; compressibility;
critical point; heat capacity, C_v

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corresponding states; dielectric constant;
Clausius-Mosotti relation; density

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Experimental; liquid-vapor; nitrogen; critical
point; heat capacity, C_v; impurities; logarithmic
singularity; stirring

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Experimental; liquid-vapor; argon; gravity
effect; heat capacity, C_v; critical point;
hydrostatic effect; stirring; logarithmic
singularity

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Theoretical; statistical mechanics; liquid-vapor; critical point; particle distribution function; heat capacity, C_v; long-range correlation function

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Experimental; binary liquid mixtures; methanol-cyclohexane; interaction range; critical solution temperature; concentration fluctuations; critical opalescence; Debye theory; light scattering

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Critical opalescence of a fluorocarbon-hydrocarbon liquid mixture. Normal perfluoroheptane-Normal heptane.
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Experimental; binary liquid mixtures; perfluoroheptane-n-heptane; light scattering; Ornstein-Zernike theory; Debye theory; solubility parameter theory; critical opalescence

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Critical opalescence of a binary liquid mixture, n-decane-β, β'-dichlorethyl ether. I. Light scattering.
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Experimental; binary liquid mixtures; polystyrene-cyclohexane; critical opalescence; small-angle x-ray scattering; light scattering; Debye theory

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Critical opalescence of a binary liquid mixture, n-decane-β,β'-dichloroethyl ether. II. Small-angle x-ray scattering.
J. Chem. Phys. 42, 2293-4 (1965).

Experimental; binary liquid mixtures; critical opalescence; n-decane-β-β'-dichloroethyl ether; small-angle x-ray scattering; Debye theory

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Critical opalescence of a binary liquid mixture, n-dodecane-β,β'-dichloroethyl ether. III. Very near the critical mixing point.
J. Chem. Phys. 42, 2608-10 (1965).

Experimental; binary liquid mixtures; n-dodecane-β-β'-dichlorethyl ether; Debye theory; critical opalescence; critical solution temperature

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Light scattering of a critical binary liquid mixture: triethylamine-water.
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Experimental; binary liquid mixtures; triethylamine-water; light scattering; Debye theory; coexistence curve; critical opalescence; critical solution temperature, upper, lower

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Critical opalescence of a fluorocarbon-hydrocarbon binary liquid mixture: normal perfluoroheptane-iso-octane.
J. Chem. Phys. 43, 2950-3 (1965).

Experimental; binary liquid mixtures; n-perfluoroheptane-i-octane; "flat top" coexistence curve; light scattering; small-angle x-ray scattering; index of refraction; Debye theory; Ornstein-Zernike theory; critical opalescence

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Experimental; binary liquid mixtures; perfluorocyclic oxide; carbon tetrachloride; perfluorocyclic oxide-n-heptane; solubility parameter theory; interaction range; index of refraction; Debye theory; critical opalescence

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Effects of isothermal compressibility and gravity on critical opalescence studies of one-component systems.
J. Chem. Phys. 46, 3267-8 (1967).

Experimental; liquid-vapor; carbon dioxide; critical point; small-angle-x-ray scattering; isothermal compressibility; gravity effect; critical opalescence; density; Debye theory

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Correlation effect in the time-dependent concentration fluctuations of the isobutyric acid-water system near its critical mixing point.
J. Chem. Phys. 47, 3816-20 (1967).

Experimental; binary liquid mixtures; isobutyric acid-water; critical solution temperature; Landau-Placzek theory; Ornstein-Zernike theory; lasers

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Experimental; binary liquid mixtures; critical solution temperature; interaction range; concentration fluctuations; isobutyric acid-water

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Theoretical; binary mixtures; liquid-vapor; solubility; mixing rules; thermodynamics; critical point

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Experimental; krypton; neutron diffraction; liquid-vapor; Lennard-Jones potential; critical temperature; critical pressure

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The physical properties of some fluorine compounds and their solutions. Part 1. Sulphur hexafluoride.
Trans. Faraday Soc. 51, 1327-33 (1955).

Experimental; liquid-vapor; sulfur-hexafluoride; vapor pressure; coexistence curve; corresponding states; critical constants; intermolecular potential

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Theoretical; phase transition

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Theoretical; Brownian motion; critical region

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Experimental; binary mixtures; ternary mixtures; ethane-propane-n-butane; critical constants

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Analytical; boiling point; critical temperature; methane-ethane; methane-propane; methane-n-butane; methane-n-pentane; methane-n-heptane; ethane-propane; ethane-n-butane; ethane-n-pentane; ethane-n-heptane; propane-n-butane; propane-n-pentane; n-butane-n-pentane; n-butane-n-heptane; n-butane-n-decane; n-pentane-n-hexane; n-pentane-n-heptane; methane-isobutane; methane-isopentane; propane-isopentane; n-pentane-neopentane; n-hexane-neopentane; methane-ethylene; ethane-propylene; propane-butene-1; n-butane-ethylene; n-heptane-ethylene; propane-acetylene; methane-cyclohexane; ethane-cyclohexane; n-pentane-cyclohexane; n-hexane-cyclohexane

[continued]

347. ethane-benzene; propane-benzene; n-pentane-benzene; n-hexane-benzene; n-pentane-toluene; n-hexane-toluene; ethylene-propylene; propylene-acetylene; neopentane-cyclohexane; neopentane-benzene; methane-ethane-propane; methane-ethane-n-butane; methane-ethane-n-pentane; methane-propane-n-butane; methane-propane-n-pentane; methane-ethylene-isobutane; ethane-propane-n-pentane; propane-n-butane-n-pentane; n-butane-n-pentane-n-hexane; ethane-propane-n-butane-n-pentane; propane-n-butane-n-pentane-n-hexane; methane-ethane-propane-n-butane-n-pentance; methane-ethane-propane-n-pentane-n-hexane; ethane-propane-n-butane-n-pentane-n-hexane

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Analytical; critical pressure; critical density; ethane-propane; ethane-n-butane; ethane-n-pentane; ethane-n-heptane; propane-n-butane; propane-n-pentane; propane-isopentane; n-butane-n-pentane; n-butane-n-heptane; n-pentane-n-heptane; ethane-propylene; n-butane-ethylene; n-heptane-ethylene; ethylene-propylene; ethane-cyclohexane; ethane-benzene; propane-benzene; n-hexane-toluene; propane-acetylene; propylene-acetylene; ethane-propane-n-pentane; propane-n-butane-n-pentane; n-butane-n-pentane-n-hexane; ethane-propane-n-butane-n-pentane; propane-n-butane-n-pentane-n-hexane; ethane-propane-n-butane-n-pentane-n-hexane; methane-ethane; methane-propane; methane-n-butane; methane-isobutane; methane-n-pentane; methane-isopentane; methane-n-heptane; methane-ethane-n-butane; methane-ethane-n-pentane; methane-propane-n-butane; methane-propane-n-pentane; methane-ethylene-isobutane; methane-ethane-propane-n-butane; methane-ethane-propane-n-butane-n-pentane; methane-ethane-propane-n-pentane-n-hexane; methane-ethane-propane-n-butane-n-pentane-n-hexane; methane-ethane-propane-n-butane-n-pentane-n-hexane-n-heptane

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function

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point: "derby hat" coexistence curve; critical
isotherm; van der Waals equation of state;
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Theoretical; phase transition ; Yang-Lee theory

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Experimental; binary mixtures; critical constants; retrograde condensation; liquid-vapor; azeotropes

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Theoretical; binary liquid mixtures; critical phenomena

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Experimental; liquid-vapor; density fluctuations; light scattering; critical point; molecular clusters

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Theoretical; liquid-vapor; critical point; equation of state; isotherms; carbon dioxide; methane; hydrochloric acid

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Theoretical; critical point; hydrostatic effect

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Theoretical; critical point; liquid-vapor; sound absorption; heat capacity, C_v, C_p

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Critical temperature of mixtures formed by benzene and octane with iso-alcohols. [Polish].
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Analytical; second virial coefficient; critical volume; binary mixtures

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Theoretical; thermodynamics; coexistence curves; phase transitions; critical point; heat capacity, C_p

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Experimental; binary liquid mixtures; phenol-water; coexistence curve; intensive mixing; critical point

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Theoretical; critical phenomena; phase transition; Gibbs-Duham equation; coexistence curve; critical point; critical isotherm; heat capacity, C_v

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Analytical; binary liquid mixtures; critical phenomena; heat capacity; critical point

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Experimental; binary liquid mixtures; triethylamine-water; impurities (carbon dioxide); coexistence curve; critical phenomena

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Experimental; binary liquid mixtures; hexamethylenimine-water; coexistence curve; critical point; critical solution temperature; rectilinear diameter; intensive mixing; heat capacity, C_p

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Experimental; binary liquid mixtures; ternary liquid mixtures; critical solution temperature (lower); triethylamine-water

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Experimental; binary liquid mixtures; hexamethyleneimine-water; intensive mixing; critical solution temperature

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Experimental; binary liquid mixtures; sulfur-carbon disulfide; sulfur-carbon tetrachloride; sulfur-benzene; sulfur-toluene; sulfur-o-xylene; sulfur-naphthalene; sulfur-biphenyl; sulfur-triphenylmethane; sulfur-cis-decaline; sulfur-trans-decaline; polymers; critical solution temperature, upper, lower; theory of regular solutions; critical region

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Theoretical; heat capacity; carbon dioxide; sound velocity; critical point; Joule-Thomson coefficient

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Theoretical; grand partition function; phase transition; equation of state; Ising model; lattice gas; Mayers expansion

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Theoretical; equation of state; critical point; sound propagation; heat capacity, C_v; ethanol; n-hexane

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Theoretical; critical constants; dimethyl oxylate

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Analytical; REVIEW; critical constants; group contributions; organic compounds

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Experimental; butyl acetate; heat capacity; sound velocity; critical point; critical temperature

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Analytical; REVIEW; equation of state; critical point

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Analytical; REVIEW; Beattie-Bridgeman equation of state; Benedict-Webb-Rubin equation of state

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Analytical; REVIEW; equation of state; critical constants; critical isotherm

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Analytical; equation of state; critical density

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Analytical; liquid-vapor; carbon dioxide; equation of state; critical region

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Theoretical; critical phenomena

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Behavior in the critical region. [French].
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Theoretical; REVIEW; van der Waals theory; light scattering; perfluoromethylcyclohexane-carbon tetrachloride; binary liquid mixtures; aniline-cyclohexane; "flat top" coexistence curve; "derby hat" coexistence curve

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Experimental; binary liquid mixtures; cyclohexane-aniline; impurities; "flat top" coexistence curve; critical phenomena

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Analytical; liquid-vapor; critical region; binary mixtures; ethane; butane; heptane

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Analytical; critical constants; vapor-liquid; propane-isopentane; methane-ethane; ethane-cyclohexane; methane-propane; propane-benzene; nitrogen-oxygen; carbon dioxide-n-butane; liquid-vapor; binary mixtures

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Experimental; binary mixtures; ternary mixtures; ethane-n butane; ethane-n-heptane; ethane-n-butane-n-pentane; ethane-n-butane-n-heptane; critical constants; vapor pressure

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Critical temperatures and critical pressures for the ethane-n-butane-n-pentane system.
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Experimental; ternary mixtures; ethane-n-butane-n-pentane; critical constants; critical isobar ; liquid-vapor

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Vapor-liquid equilibrium in the ethane-n-heptane system.
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Experimental; binary mixtures; ethane-n-heptane; critical constants; critical point; intensive mixing; liquid-vapor

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J. Chem. Eng. Data 10, 307-9 (1965).

Experimental; binary mixtures; ethane-n-butane; critical point; critical pressure; intensive mixing; liquid-vapor

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Note on the behaviour of a vapour-liquid system above and below the critical point.
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Theoretical; van der Waals equation of state; phase transition ; heat capacity, C_p; critical point; Maxwell equal-area rule; Gibbs function

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Analytical; compressibility; gases; critical point; critical constants

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Direct observation of cluster formation at the critical point of carbon dioxide. [German].
Z. Physik 130, 196-201 (1951).

Experimental; liquid-vapor; carbon dioxide; light scattering; critical opalescence; clusters

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Theoretical; liquid-vapor; density fluctuations; Ornstein-Zernike theory

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Equilibrium diagrams of ternary liquid systems containing three binary phase separations with upper consolute temperatures. VI. Equilibrium between liquid phases in the glycerol-n-pentanol-nitromethane system. [Russian].
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Theoretical; critical fluctuations; random phase approximation; condensation; interaction range; liquid-vapor; equation of state; critical temperature; density correlation function; compressibility; Ornstein-Zernike theory

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Theoretical; density correlation function; random phase approximation; Ornstein-Zernike theory; interaction range; critical temperature; van der Waals equation of state; liquid vapor

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Properties of heterogeneous regions in ternary systems near the critical points. [Russian].
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Theoretical; ternary liquid mixtures; critical point

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Analytical; ternary liquid systems; water-acetone-glycerol; o-toluidine-hexane-octane; water-aniline-pyridine; critical region; water ethanol-carbon tetrachloride; water-acetone-carbon tetrachloride; water-ethanol-toluene; water-acetic anhydride-octane; coexistence curve ; index of refraction; water-ethanol-hexane; water-benzene-piperidine; water-toluene-pyperidine

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Experimental; ternary liquid mixtures; coexistence curve ; index of refraction; chloral hydrate-water-diethylamine

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Experimental; ternary liquid mixtures; water-phenol pyridine; coexistence curve; critical solution temperature, upper,lower

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Analytical; parachor; critical constants

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Vapour pressure of liquid xenon.
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Experimental; xenon; vapor pressure; critical pressure

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The specific heat at constant volume of carbon dioxide in the neighbourhood of the critical point.
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Experimental; liquid-vapor; carbon dioxide; heat capacity, C_v; critical point

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Specific heat at constant volume near the critical point. [French].
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Experimental; liquid-vapor; carbon dioxide; heat capacity, C_v, critical point

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The vapour pressure of liquid krypton.
Physica 18, 63-6 (1952).

Experimental; krypton; vapor pressure; critical point; triple point

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Physica 18, 613-28 (1952).

Experimental; liquid-vapor; carbon dioxide; heat capacity, C_v; critical region

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Condensed systems in the neighborhood of the critical point.
Ned. Tijdschr. Natuurk. 19, 231-50 (1953) [Dutch].

Analytical; liquid-vapor; carbon dioxide; critical point; heat capacity, C_v

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Experimental; liquid-vapor; xenon; critical region; isotherms

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Experimental; REVIEW: liquid-vapor; binary liquid mixtures; xenon; sulfur hexafluoride; aniline-hexane; critical temperature; critical solution temperature; coexistence curve; van der Waals equation of state; gravity effect; radioactive tracers [xenon]

796. Schneider, W. G. and A. Chynoweth.
Thermodynamics of the critical point.
J. Chem. Phys. 19, 1607 (1951).

Theoretical; thermodynamics; critical point; sound velocity; sound absorption; heat capacity, C_v; liquid-vapor; carbon dioxide; sulfur hexafluoride; xenon; ethylene

797. Schneider, W. G. and H. W. Habgood.
Gravitational effects in PVT measurements in the critical region.
J. Chem. Phys. 21, 2080-2 (1953).

Experimental; gravity effect; xenon; liquid-vapor; critical point; critical isotherm

798. Schuberth, Horst.
Thermodynamic similarities, differences, and relations between isothermal vapor-liquid phase equilibria. [German].
Wiss. Z. Tech. Hochsh. Chem., Leuna-Merseburg 6(3/4) 440-51 (1964).

Analytical; liquid-vapor; binary liquid; retrograde condensation; critical phenomena

799. Scott, Robert L.
Second-order transitions and critical phenomena.
J. Chem. Phys. 21, 209-11 (1953).

Theoretical; critical phenomena; liquid-vapor; binary liquid mixtures; phase transition ; heat capacity

800. Scott, Robert L.
Some unsolved problems of liquids and solutions.
J. Chem. Educ. 30, 542-9 (1953).

Theoretical; critical phenomena; theory of liquids; theory of regular solutions; "flat top" coexistence curve; "derby hat" coexistence curve; van der Waals theory; clusters; Clausius-Clapyeron equation

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Phase equilibria in solutions of liquid sulfur. I. Theory.
J. Phys. Chem. 69, 261-70 (1965).

Analytical; Flory-Huggins equation; polymers; critical solution temperature, lower ; binary liquid mixtures; coexistence curve

802. Semenchenko, V. K.
Chemocritical phenomena. [Russian].
Dokl. Akad. Nauk SSSR 74, 335-7 (1950).

Theoretical; critical point vs. critical region; phase transition

803. Semenchenko, V. K.
Phase transitions of the second kind and critical phenomena. II. Thermodynamics of generalized critical phenomena. [Russian].
Zh. Fiz. Khim. 25, 121-6 (1951).

Theoretical; phase transition; critical phenomena; critical point; equation of state; heat capacity, C_p

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Phase transitions of the second kind and critical phenomena. III. Heat capacity of binary liquid mixtures near the critical solution temperature. [Russian].
Zh. Fiz. Khim. 25, 362-8 (1951).

Experimental; binary liquid mixtures; triethylamine-water; nitrobenzene-hexane; critical solution temperature; heat capacity, C_p

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Fundamental properties of generalized critical phenomena. [Russian].
Zh. Fiz. Khim. 26, 1337-48 (1952).
Translation: LC or SLA 60-15063

Experimental; REVIEW; critical phenomena

806. Semenchenko, V. K. and V. K. Skripov.
Heat capacity of binary liquid mixtures in the critical region of layering. [Russian].
Dokl. Akad. Nauk SSSR, 85, 1325-7 (1952).

Experimental; binary liquid mixtures; triethylamine-water; heat capacity, C_p; critical region

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The physical meaning of the concept of the critical region and critical point and their experimental determination. [Russian].
Dokl. Akad. Nauk 87, 441-3 (1952).
Translation: LC or SLA 60-13011

Theoretical; critical point; critical region; thermodynamics

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Pseudocritical points and generalized critical transitions. [Russian].
Dokl. Akad. Nauk SSSR 92, 625-7 (1953).
Translation: LC or SLA 60 - 15064.

Theoretical; critical point; phase transition

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Pseudocritical transitions and phase transitions of the second kind. [Russian].
Dokl. Akad. Nauk SSSR 99, 1045-8 (1954).

Theoretical; phase transitions; van der Waals equation of state; Dieterici equation of state; critical point

810. Semenchenko, V. K.
Critical phenomena and phase transitions of the second kind. [Russian].
Izv. Sektora Fiz-Khim. Analiza, Inst. Obshch. Neorgan. Khim., Akad. Nauk SSSR, 26, 56-61 (1955).

Theoretical; phase transition ; critical phenomena

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Second order phase transitions and critical phenomena. VI. The effects of small admixtures to the triethylamine-water system in the critical layer formation region. [Russian].
Zh. Fiz. Khim. 29, 194-7 (1955).

Experimental; binary liquid mixtures; triethylamine-water; impurities (isoamylalcohol, Me_4NI); critical temperature; hysteresis; critical point; heat capacity

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Second-order phase transitions and critical phenomena. VII. Dielectric permeability of the nitrobenzene-hexane system in the critical region. [Russian].
Zh. Fiz. Khim. 30, 1821-9 (1956).

Experimental; nitrobenzene-hexane; phase transition critical phenomena; dielectric permeability; heat capacity

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Dielectric constants of binary systems in the critical region. [Russian].
Zh. Fiz. Khim. 30, 2228-35 (1956).

Experimental; binary liquid mixtures; nitrobenzene-heptane; nitrobenzene-octane; dielectric constants; critical region

814. Semenchenko, V. K.
Critical phenomena and the disperse state. [Russian].
Vses. Konf. Kolloidnoi Khim., Akad. Nauk SSR. Otd. Khim. Nauk, Minsk (1956) pp. 250-7.

Theoretical; critical region; critical point; liquid-vapor; thermodynamics

815. Semenchenko, V. K.
Generalized critical phenomena. [Russian].
Primenenie Ul'traakustiki k Issled. Veshchestva. No. 3, 51-69 (1956).

Theoretical; critical phenomena; phase transition ; thermodynamics; Clausius-Clapeyron equation

816. Semenchenko, V. K.
Phase transitions and critical effect in anisotropic phases. [Russian].
Kristallografiya 2, 145-52 (1957).

Theoretical; phase transition; critical phenomena

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Phase transitions of the second order and the critical phenomena. VIII. Heat capacities of liquid mixtures in the critical separation range. [Russian].
Zh. Fiz. Khim. 32, 121-9 (1958).

Experimental; binary liquid mixtures; ternary liquid mixtures; heat capacity; critical concentration; ethanol-water-sodium nitrate

818. Semenchenko, V. K. and K. V. Arkhangel'skii.
Dielectric permeability and dielectric losses for binary systems in the critical region. [Russian].
Zh. Fiz. Khim. 33, 230-2 (1959).

Experimental; binary liquid mixtures; nitrobenzene-heptane; dielectric loss; critical region; dielectric permeability

819. Semenchenko, V. K. and E. L. Zorina.
The effect of nonylalcohol on critical phenomena in the triethylamine-water system. [Russian].
Zh. Fiz. Khim. 33, 1176-83 (1959).

Experimental; binary liquid mixtures; triethylamine-water; impurities, nonyl-alcohol; viscosity

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Dielectric parameters of binary liquid systems in the critical and adjacent regions. [Russian].
Stroenie i Fiz. Svoistva Veshchestva v Zhidkom Sostoyanii, Min. Vysshego i Srednego Spets. Obrazov. Ukr. SSR. Kievsk. Gos. Univ. Materialy-4 go Soveshch., Kiev (1959) pp. 135-8. [Publ. 1962].

Experimental; binary liquid mixtures; heptane-nitrobenzene; critical region; dielectric constants; dielectric loss

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Physical nature of phase transitions of the second order. [Russian].
Zh. Fiz. Khim. 34, 1649-50 (1960).
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Theoretical; phase transition ; critical phenomena

822. Semenchenko, V. K. and K. V. Arkhangel'skii.
Dielectric constant and losses in critical binary liquid systems. [Russian].
Zh. Fiz. Khim. 35, 927-31 (1961).
Russ. J. Phys. Chem. 35, 454-7 (1961).

Experimental; binary liquid mixtures; nitrobenzene-heptane; dielectric constants; impurities

823. Semenchenko, V. K.
Thermodynamics of critical and hyper-critical phenomena in solutions. [Russian].
Zh. Fiz. Khim. 35, 2448-57 (1961).
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Theoretical; binary liquid mixtures;
phase transition

824. Semenchenko, V. K. and S. Akhrarov.
Dielectric constant of binary systems in the critical region. [Russian].
Vopr. Sovrem. Fiz. i Mat., Akad. Nauk Uz. SSR (1962) pp. 9-14.

Experimental; binary liquid mixtures;
nitrobenzene-cyclohexane; nitrobenzene-nonane;
dielectric constant; phase transition

825. Semenchenko, V. K.
Thermodynamic stability theory. [Russian].
Zh. Fiz. Khim. 38, 2311-16 (1964).
Russ. J. Phys. Chem. 38, 1253-5 (1964).

Theoretical; thermodynamic stability;
phase transition

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Trans-critical region of water. [Russian].
Zh. Fiz. Khim. 39, 3105-7 (1965).
Russ. J. Phys. Chem. 39, 1662-3 (1965).

Analytical; thermodynamic stability; liquid-vapor;
critical point; trans-critical region

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Thermodynamics of below-critical phenomena in condensed systems. [Russian].
Zh. Fiz. Khim. 40, 1082-5 (1966).
Russ. J. Phys. Chem. 40, 581-4 (1966).

Analytical; liquid-vapor; phase transition; water

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Fluctuations in solutions. [Russian].
Kriticheskie Yavleniya i Flyuktuatsii v Rastvorakh, Mosk. Gos. Univ., Tr. Soveshch., Moscow, 1960, pp. 151-60.

Theoretical; binary liquid mixtures; acetone-benzene;
nitrobenzene-octane; concentration fluctuations

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The dependence of the dielectric constant on temperature in the critical region. [Russian].
Vestn. Mosk. Univ. Ser. Khim. 16, No. 4, 25-30 (1961)

Theoretical; thermodynamics; critical region;
dielectric constants; binary liquid mixtures;
nitrobenzene-n-heptane; nitrobenzene-n-octane;
concentration fluctuations

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Behavior of He^3 in the critical region.
Phys. Rev. Letters 15, 141-2 (1965).

Experimental; liquid-vapor; critical region; compressibility; coexistence curve; critical isotherm; critical isochore; $helium^3$

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The coexistence curve of He^3.
Critical Phenomena. Proc. Conf., Washington, D. C., April 1965. Natl. Bur. Std. Misc. Publ. 273, 7-8 (1966).

Experimental; He^3 liquid-vapor; critical region; coexistence curve; critical temperature; critical pressure; critical point

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Application of the quantum theory of corresponding states to the problem of critical-point exponents.
Phys. Rev. Letters 15, 9-11 (1965).

Theoretical; critical point; quantum theory; critical region; DeBoer's theory of corresponding states; gravity effect; $helium^3$; hydrogen; xenon

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The equilibrium of the liquid phases in the system water-isooctane-aniline. [Russian].
Izv. Vysshikh. Ucheb. Zavedenii, Khim. i Khim. Tekhnol. 2, 881-5 (1959).

Analytical; ternary liquid mixtures; water-isooctane-aniline; critical point; critical solution temperature, upper

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Investigation of the critical state of matter by Toepler's method. I. Experimental. [Ukrainian].
Ukr. Fiz. Zh. 3, 542-51 (1958).

Experimental; liquid-vapor; ethyl ether; density gradients; critical point

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Investigation of the critical state of matter by Toepler's method. III. Dependence of the density of an octane solution in hexane on temperatures near the liquid-vapor critical point. [Ukrainian].
Ukr. Fiz. Khim. 5, 549-59 (1960).

Experimental; binary liquid mixtures; octane-hexane; compressibility; gravity effect; density gradients; hysteresis

836. Shimanskaia, E. T. and A. Z. Golik.
A study by Toepler's method of the liquid-vapor critical state of solutions. [Russian].
Kriticheskie Yavleniya i Flyuktuatsii v Rastvorakh, Mosk. Gos. Univ., Tr. Soveshch., Moscow, 1960, pp. 161-70.

Experimental; binary liquid mixtures; hexane-octane; gravity effect; density gradients; hysteresis

837. Shimanskaia, E. T., Iu. I. Shimanskii and A. Z. Golik.
Investigation of the critical state of pure substances by Toepler's method. [Russian].
Kriticheskie Yavleniya i Flyuktuatsii v Rastvorakh, Mosk. Gos. Univ., Tr. Soveshch., Moscow, 1960, pp. 171-88.

Experimental; liquid-vapor; heptane; hysteresis; critical point

838. Shimanskaia, E. T. and Iu. I. Shimanskii.
The critical state of pure substances. [Russian].
Kiev, Izd. Kievsk Univ. 1961. 40 pp.

Experimental; critical region; liquid-vapor

839. Shimanskii, Iu. I.
Temperature dependence of the saturated vapor pressure curve near the critical point. [Russian].
Visn. Kiivsk Univ. No. 2. Ser. Fiz. ta Khim No. 1, 61-4 (1959).

Analytical; critical point; critical temperature; rectilinear diameter; vapor pressure; liquid-vapor benbenzene; hexane; heptane; octane; Clausius-Clapyeron equation

840. Shimanskii, Iu. I. and E. T. Shimanskaia.
Density of benzene near the critical point. [Russian].
Ukr. Fiz. Zh. 7, 861-8 (1962).

Experimental; liquid-vapor; benzene; critical point; critical opalescence

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Properties of coexistent phases in a lattice gas model. [Ukrainian].
Ukr. Fiz. Zh. 12, 1172-5 (1967).

Theoretical; lattice gas; critical point; Bragg-Williams approximation; heat capacity, C_v

842. Shimanskii, Iu. I.
On a jump of heat capacity, C_v, when crossing a coexistence curve near the critical point-liquid-vapor. [Ukrainian].
Ukr. Fiz. Zh. 12, 1356-60 (1967).

Theoretical; liquid-vapor; critical point; heat capacity, C_v; coexistence curve; Bragg-Williams approximation

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Condensation theory by cell method and calculation of the critical temperature of various gases. [Japanese].
Busseiron Kenkyu 62, 138-51 (1953).

Theoretical; liquid-vapor; helium; hydrogen; nitrogen; oxygen; methane; free energy; surface tension; critical temperature; partition function

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Statistical theory of phase transition. I. General theory for lattice gas.
J. Phys. Soc. Japan 9, 451-6 (1954).

Theoretical; phase transition ; lattice gas; molecular clusters; partition function; equation of state; statistical mechanics

845. Shimose, Ikuro.
Statistical theory of phase transitions. II. Numerical calculation for lattice gas.
J. Phys. Soc. Japan 9, 457-9 (1954).

Theoretical; phase transition ; statistical mechanics; lattice gas; vapor density; liquid density; partition function

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Equation of state for vapor-liquid-solid system.
J. Phys. Soc. Japan 10, 860-4 (1955).

Theoretical; equation of state; order-disorder; vapor-liquid; liquid-solid; lattice gas; free energy; critical point; statistical mechanics

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Statistical Theory of phase transition. III. Application to vapor-liquid-solid equilibrium.
J. Phys. Soc. Japan 11, 202-5 (1956).

Theoretical; statistical mechanics; phase transition ; molecular clusters; partition function; equation of state; vapor-liquid; liquid-solid

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Lattice theory of the liquid state.
J. Phys. Soc. Japan 11, 615-19 (1956).

Theoretical; theory of liquids; lattice theory; cell model; partition function; statistical mechanics; virial coefficient; critical point; molecular distribution function

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Liquid-liquid solubility of pentaerythritol tetraperfluorobutyrate with chloroform, carbon tetrachloride and octamethylcyclotetrasilotane.
J. Phys. Chem. 62, 481-3 (1958).

Experimental; binary liquid mixtures; coexistence curve; critical constants; entropy

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Critical composition in liquid mixtures of components of very different molar volumes.
J. Phys. Chem. 65, 1385-6 (1961).

Experimental; binary liquid mixtures; pentaerythnol tetraperfluorobutyrate ; critical temperature; entropy of mixing; "Flory-Huggins" mixing

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Metastable states of a finite lattice gas.
Phys. Rev. 97, 1456-62 (1955).

Theoretical; statistical mechanics; lattice gas; critical temperature; range of intermolecular forces; Ising model; fugacity

852. Simons, J. H. and R. D. Dunlap.
The properties of n-pentforane and its mixture with n-pentane.
J. Chem. Phys. 18, 335-46 (1950).

Theoretical; experimental; theory of ideal solutions; theory of regular solutions; n-pentane-n-pentforane; liquid-vapor; critical solution temperature; interaction range; Raoult's law

853. Sirkar, S. C. and Anjali Choudhury.
Nature of grouping of molecules in opalescent binary liquid mixtures.
Nature 167, 198 (1951).

Experimental; binary liquid mixtures; nitrobenzene-hexane; ultrasonic absorption; aniline-cyclohexane; sound absorption; critical opalescence

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Heat capacity and enthalpy of water vapor at pre-critical pressures. [Russian].
Teploenerg. No. 7, 10-13 (1958).
Translation LC/SLA 61-15409

Experimental; water; heat capacity, C_p; enthalpy

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On the caloric properties of water at pressures up to 500 and temperatures up to 300°C. [Russian].
Teploenerg. No. 10, 67-70 (1959).
Translation: OTS 62-11333

Experimental; water; heat capacity, C_p

856. Sirota, A. M. and B. K. Mal'tsev.
Experimental investigation of the heat capacity of water at temperatures of 10-500°C and pressures up to 500 kg/cm^2. [Russian].
Teploenerg. No. 9, 7-15 (1959).
Translation; OTS/SLA 62-19935

Experimental; water; heat capacity, C_p

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Experimental data on the heat capacity of water vapor at pressures between 300-500 atms. and temperatures between 500-600°C. [Russian].
Teploenerg. No. 10, 67-8 (1960).
Translation: Transatom. Bull. 1, 445 (1961).

Experimental; heat capacity; water; supercritical region

858. Sirota, A. M. and B. K. Mal'tsev.
Heat capacity of water in the critical region. [Russian].
Toploenerg. 9, No. 1, 52-7 (1962).

Experimental; liquid-vapor; water; critical region; heat capacity, C_p

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Experimental investigation of the heat capacity of water vapor in the pre-critical region. [Russian].
Teploenerg. No. 7, 16-23 (1956).
Translation: OTS/SLA 62-24074

Experimental; liquid-vapor; water; heat capacity, C_p

860. Sivtsev, D. M.
Discovery of the critical temperature. [Russian].
Uch. Zap. Yakutsk. Gos. Univ. Ser. Estestven. Nauk No. 1, 33-47 (1957).

Theoretical; REVIEW; critical temperature

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Liquid-vapor phase behavior in the critical region of the binary systems benzene with n-alcohols.
Dissertation. The Ohio State University. (1961).

Theoretical; Experimental; binary liquid mixtures; methanol-benzene; n-propanol-benzene; n-butanol-benzene; ethanol-benzene; azeotropes; conformal solution theory; critical constants; liquid-vapor; critical point

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Asymmetry of the critical opalescence in polymer solutions. [Russian].
Vysokomolekul. Soedin. 2-627-8 (1960).

Experimental; binary liquid mixtures; polybutylmethylacrylate-isopropanol; polystyrene-cyclohexane; Debye's theory; critical opalescence; angular dissymmetry

863. Skripov, V. P. and V. K. Semenchenko.
Phase transitions of the second kind and critical phenomena. V. Maximum heat capacity in the critical range of layer formation in binary liquid mixtures. [Russian].
Zh. Fiz. Khim. 29, 174-84 (1955).

Experimental; binary liquid mixtures; nitrobenzene-heptane; critical point; heat capacity; triethylamine-water

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Decrease of light intensity by carbon dioxide in the post-critical region. [Russian].
Opt. i Spektroskopiya 1020-1 (1956).

Experimental; liquid-vapor; light scattering; carbon dioxide; critical region

865. Skripov, V. P.
Energy fluctuations in solutions and their relations to the heat capacity. [Russian].
Thermodinam. i Stroenie Rastvorov, Akad. Nauk SSSR, Otd. Khim. Nauk i Khim. Fak., Mosk. Gos. Univ., Tr. Soveshch. (1958) pp. 43-8 (Publ. 1959).

Theoretical; concentration fluctuations; energy fluctuations; light scattering; critical temperature; binary liquid mixtures; methyl alcohol-benzene

866. Skripov, V. P. and Iu. D. Kolpakov.
Light scattering in carbon dioxide along pre-critical and post-critical isotherms. [Russian].
Kriticheskie Yavleniya i Flyuktuatsii v Rastvorakh, Mosk. Gos. Univ., Tr. Soveshch, Moscow, 1960, pp. 126-36.

Experimental; liquid-vapor; carbon dioxide; first-order phase transition; light scattering; Rayleigh's law

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Investigation of the critical phase transition in carbon dioxide by light scattering. [Russian].
Inzh. - Fiz. Zh. Akad. Nauk Belorussk. SSR 3 (4), 30-6 (1960).

Experimental; liquid-vapor; carbon dioxide; critical point; light scattering; critical isotherm

868. Skripov, V. P. and Iu. D. Kolpakov.
Light scattering in the vicinity of the critical liquid-vapor point. I. Apparatus. Experiments with carbon dioxide and sulfur hexafluoride. [Russian].
Opt. i. Spektroskopiya 19, 392-402 (1965).
Opt. Spectry.(USSR) (English Transl.) 19, 220-5 (1965).

Experimental; liquid-vapor; carbon dioxide; sulfur hexafluoride; light scattering; critical point; Ornstein-Zernike theory; Clausius-Mossotti equation

869. Skripov, V. P. and Iu. D. Kolpakov.
Determination of the correlation distance near the critical point by the scattering of light. [Russian].
Opt. i Spektroskopiya 19, 645-7 (1965).
Opt. Spectry. (USSR) (English Transl.) 19, 360-1 (1965).

Theoretical; liquid-vapor; carbon dioxide; light scattering; Ornstein-Zernike theory; critical point; index of refraction

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Shape of the spinnodal curve in the liquid-vapor system and the rectilinear diameter rule. [Russian].
Zh. Fiz. Khim. 39, 348-40 (1965).
Russ. J. Phys. Chem. 39, 225-7 (1965).

Theoretical; van der Waals equation of state; Dieterici equation; rectilinear diameter; critical point

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Important property of the spinodel. [Russian].
Teplofiz. Vysokikh. Temperatur. Akad. Nauk SSSR 4, 816-20 (1966)
High Temp. (USA) 4, 575-60 (1966).

Theoretical; critical point; Planck-Gibbs rule; coexistence curve; equation of state

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Thermodynamic theory for the vapor-liquid critical region for water.
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Theoretical; thermodynamics; water; liquid-vapor; critical region; surface tension

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Ultrasonic light diffraction patterns in ethylene in the critical region.
Acustica (Intern.) 16, 312-23 (1965-66).

Experimental; liquid-vapor; ethylene; ultrasonic propagation; light diffraction

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Measurement of the speed of sound in the binary system CH_3OH - n - C_6H_{14} having a critical temperature of solution. [Russian].
Zh. Fiz. Khim. 28, 906-13 (1954).

Experimental; binary liquid mixtures; rectilinear diameter; sound velocity; critical solution temperature; methanol-n-hexane

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The density and compressibility of the binary mixture methanol-hexane that has a top critical temperature of solution and a comparison with the values of these parameters in the critical region for a liquid-vapor system. [Russian].
Zh. Fiz. Khim. 28, 1581-90 (1954).

Experimental; binary liquid mixtures; liquid-vapor; critical solution temperature, upper; density; compressibility; methanol-n-hexane

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Visual observations in the critical region. [Russian].
Kriticheskie Yavleniya i Flyuktuatsii v Rastvorakh, Moskov. Gos. Univ., Tr. Soveshch. Moscow 1960, pp. 137-41.

Experimental; binary liquid mixture; methanol-n-hexane; fluctuations; critical region

877. Smirnov, B. A.
The transition of partially miscible binary mixtures through the critical region. [Russian].
Zh. Fiz. Khim. 35, 2249-55 (1961).
Russ. J. Phys. Chem. 35, 1109-13 (1961).

Experimental; binary liquid mixtures; critical solution temperature, upper; stirring; miscibility; phase transition; critical opalescense; methanol-n-hexane

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Transition of a partially miscible binary mixture through the critical region. [Russian].
Zh. Fiz. Khim. 35, 2429-36 (1961).
Russ. J. Phys. Chem. 35, 1200-4 (1961).

Theoretical; liquid-vapor; binary liquid mixtures; stirring; critical region; critical temperature; critical opalescence; miscibility

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Some features of the mutual solubility phenomenon observed in the critical mixing regions. [Russian].
Teplo-i Massoperanos 3, 271-8 (1965).

Experimental; binary liquid mixtures; methanol-n-hexane; critical solution temperature, upper

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Review of physico-chemical data on the state of supercritical fluids.
Economic Geology and the Bull. Soc. Economic Geologists 48, 14-38 (1953).

Theoretical; REVIEW; fluids; molecular clusters; binary mixtures; x-ray scattering; phase transition ; critical phenomena

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Correlation of critical temperatures with thermal expansion coefficients of organic liquids.
J. Phys. Chem. 58, 443-7 (1954).

Analytical; liquid-vapor; equation of state; thermal coefficient of expansion; critical temperature

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Phase behavior of the hydrogen sulfide-carbon dioxide system from the critical of hydrogen sulfide to the eutectic temperature at -140°F and of the methane-hydrogen sulfide-carbon dioxide system between -75°F and 148°F.
Dissertation. Univ. Kansas. (1963).

Experimental; binary mixtures; ternary mixtures; hydrogen sulfide-carbon dioxide; methane-hydrogen sulfide-carbon dioxide; critical point

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On the kinetic theory of a van der Waals gas.
Can. J. Phys. 45, 363-36 (1967).

Theoretical; van der Waals equation of state; kinetic theory; metastable states

884. Sokolov, Iu. A.
Relation between parameters of saturated vapors of pure liquids [Russian].
Izv. Akad. Nauk Kaz. SSR No. 130, Ser. Energ. Nos. 4/5, 56-64 (1954).

Analytical; van der Waals equation of state;
Clausius-Clapyron equation; liquid-vapor; critical point;
water; helium; ammonia; carbon dioxide; sulfur dioxide;
methyl chloride; mercury

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Vapor pressures, the saturated aliphatic hydrocarbons.
Am. Inst. Chem. Engrs. J. 2, 347-53 (1956).

Experimental; vapor pressure; critical point;
liquid-vapor; methane; ethane; propane; butane

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critical point; critical temperature; critical
pressure

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critical point

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Analytical; critical constants; corresponding states

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Theoretical; critical state; critical temperature; electrostatic field; dielectric constants

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Theoretical; critical region; Kerr effect; light scattering; electric field; dielectric properties

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Theoretical; density fluctuations; critical temperature; phase transition

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critical temperature; corresponding states;
krypton-helium

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critical point; gravity effect; "flat top"
coexistence curve

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point; liquid-vapor; compressibility; density;
gravity effect

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liquid-vapor; critical point; benzene-octane

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critical region; impurities, (air)

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Theoretical; van der Waals equation of state; binary liquid mixtures; ternary liquid mixtures; azeotropes; corresponding states; critical constants

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Theoretical; statistical mechanics; thermodynamics; critical region; phase transition; liquid-vapor

1064. Zhil'kov, E. A. and R. L. Stratonovich
Statistical theory of the critical point. [Russian].
Izv. Vysshikh. Uchebn. Zavedenii, Fiz. No. 4, 54-60 (1964).

Theoretical; liquid-vapor; critical point; statistical mechanics

1065. Zhivojinov, Jovanka M.
Determination of the critical pressure of monatomic elements. [French].
J. Phys. (Paris) Suppl. 25, 38A-40A (1964).

Theoretical; critical pressure; liquid-vapor; argon; xenon

1066. Zhuravlev, E. F.
Systems with an upper triple critical point. [Russian].
Uchenye Zapiski Molotov. Gosudarst. Univ. im. A. M. Gor'kogo 8, No. 3, Mat., Fiz. i Khim. 3-14 (1954).

Experimental; ternary liquid mixtures;
n-phenylenediamine-resorcinol-water;
antipyrine-resorcinol-water;
antipyrine-pyrocatechol-water;
antipyrine-chloralhydrate-water;
pyridine-chloral hydrate-water;
critical solution temperature, upper; critical point

1067. Zhuravlev, E. F.
Systems with a lower ternary critical point. I. Layer formation in the chloral hydrate-water-pyramidon system. [Russian].
Zh. Obshch. Khim. 29, 3178-83 (1959).
J. Gen. Chem. (USSR) 29, 3144-48 (1959).

Experimental; ternary liquid mixtures;
chloral hydrate-water-pyramidon; liquid-liquid;
critical solution temperature, lower;

1068. Zhuravlev, E. F.
Phase diagrams of ternary liquid systems containing two binary stratifications with lower critical temperatures of solution. I. [Russian].
Zh. Obshch. Khim. 30, 7-12 (1960).
J. Gen. Chem. (USSR) 30, 6-10 (1960).

Analytical; ternary liquid mixtures; critical
solution temperature, upper

1069. Zhuravlev, E. F.
Phase diagrams of ternary liquid systems containing two-binary layers with lower critical solubility temperatures. II. Layering-out in systems of triethylamine-pyramidon-water and diantipyrylmethylmethylamine-pyramidon- water. [russian].
Zh. Obshch. Khim. 30, 12-20 (1960).
J. Gen. Chem. (USSR) 30, 11-18(1960).

Analytical; ternary liquid mixtures;
critical solution temperature, lower;
triethylamine-pyramidon-water;
diantipyrylmethylmethylamine, critical point

1070. Zhuravlev, E. F.
Phase diagrams of ternary liquid systems containing two binary layers with different critical points. [Russian].
Izv. Vysshikh Uchebn . Zavedenii, Khim. i Khim. Tekhnol. 3, 997-1001 (1960).

Theoretical; ternary liquid mixtures;
critical point; critical solution temperature

1071. Zhuravlev, E. F.
The diagrams of state of ternary liquid systems containing two binary layers with different critical points. III. Layering in the system pyramidon-water-succinic acid nitrile and pyramidon-water-phenylhydrazine. [Russian].
Zh. Obshch. Khim. 34, 1710-16 (1964).
J. Gen. Chem. (USSR) 34, 1724-9 (1964).

Experimental; ternary liquid mixtures; pyramidon-water-succinic acid nitrile; pyramidon-water-phenylhydrazine; critical solution temperature, lower; critical point; critical opalescence

1072. Zhuravlev, E. F. and I. K. Mel'nikova.
Phase diagrams of ternary liquid systems containing three binary layering solutions with upper critical points. Liquid phase equilibria in the system water-succinic nitrile-n-butyl alcohol. [Russian].
Zh. Obshch. Khim. 34, 1716-22 (1964).
J. Gen. Chem. (USSR) 34, 1730-4 (1964).

Experimental; ternary liquid mixtures; water-succinic nitrile-n-butyl alcohol; critical solution temperature, upper; critical point

1073. Zieborak, K., Z. Maczynska and A. Maczynski.
Hetero-polyazeotropic systems. I. System methanol-n-parafluric hydrocarbons.
Bull. Acad. Polon. Classe III. Ser. Sci. Chim. Geol. et Geograph. 4, 153-7 (1956).

Experimental; decane-methanol; undecane-methanol; critical solution temperature; methanol-heptane; methanol-octane; methanol-nonane; azeotropes

1074. Zieborak, K. and K. Olszewski.
Hetero-polyazeotropic systems. II. Acetonitrile-n-parafluric hydrocarbons.
Bull. Acad. Polon. Sci. Classe III. Ser. Sci. Chim. Geol. et Geograph. 4, 823-7 (1956).

Experimental; binary liquid mixtures; acetonitrile-i-heptane; acetonitrile-i-octane; acetonitrile-n-nonane; acetronitrile-i-decane; acetonitrile-i-undecane; critical temperature; azeotropes

1075. Zieborak, K. and K. Olszewski.
Solubility of n-paraffins in acetic acid.
Bull. Acad. Polon. Sci. Ser. Sci. Chim. Geol. et Geograph. 6, No. 2, 115-21 (1958).

Experimental; acetic acid-n-octane; phase rule; acetic acid-n-undecane; acetic acid-n-dodecane; impurities; critical solution temperature

1076. Zieborak, J. and K. Olszewski.
Critical solubility temperatures of the series of binary mixtures of n-paraffins with some solvents.
Bull. Acad. Polon. Sci. Ser. Sci. Chim., Geol. et Geograph. 6, No. 2 122-31 (1958).

Analytical; azeotropes; binary liquid mixtures; critical solution temperature

1077. Zieborak, K.
On the shape of the boiling temperature izobars [sic] near the critical solubility temperature.
Bull. Acad. Polon. Sci. Ser. Sci. Chim., Geol. et Geograph. 6, No. 7 439-42 (1958).

Analytical; binary liquid mixtures; critical solution temperature, upper; azeotropes; boiling temperature isobars

1078. Zieborak, K.
On the boiling temperature isobars of liquid mixtures near the critical solubility temperature in n-hexane-aniline systems.
Bull. Acad. Polon. Sci. Ser. Sci. Chim., Geol. et Geograph. 6 No. 7, 443-7 (1958).

Experimental; binary liquid mixtures; n-hexane-aniline; ebuliometric measurements; critical solution temperature; critical isobar; boiling temperature isobars

1079. Zilberman, E. N.
Physicochemical properties of cyclohexanol-water. I. Mutual solubility of cyclohexanol-water. [Russian].
Zh. Prik. Khim. 24, 776-8 (1951).
J. Appl. Chem. USSR 24, 883-5 (1951).

Experimental; critical temperature; binary liquid mixtures; solubility

1080. Zilberman, E. N.
Determination of the critical point of a ternary mixture of partially miscible liquids with one vapor. The system water-benzene-hexamethyleminine. [Russian].
Zh. Fiz. Khim. 26, 1458-61 (1952).

Experimental; ternary liquid mixture; water-benzene-hexamethylenimine; retrograde condensation; miscibility

1081. Zilberman, T. N. and Z. D. Skorikova.
Systems with completely closed solubility curves. Mutual solubility of hexamethylenimine and water. [Russian].
Zh. Obshch. Khim. 23, 1629-30 (1953).

Experimental; binary liquid mixtures; hexamethylenimine-water; critical solution temperature, lower; solubility

1082. Zimm, Bruno H.
Opalescence of a two-component liquid system near the critical mixing point.
J. Phys. Colloid Chem. 54, 1306-17 (1950).

Experimental; binary liquid mixtures; critical solution temperature; carbon tetrachloride-perfluoromethylcyclohexane; critical opalescence; isotherms; light scattering; Ornstein-Zernike theory; impurities; second-order phase transition; critical point

1083. Zimm, Bruno H.
Contribution to the theory of critical phenomena.
J. Chem. Phys. 19, 1019-23 (1951).

Theoretical; critical point; Mayer theory; van der Waals theory; clusters; fugacity

1084. Zimm, Bruno H.
The shape of the coexistence curve in the critical region.
J. Chem. Phys. 20, 538 (1952).

Theoretical; binary liquid mixtures; coexistence curve; critical region

1085. Zimm, Bruno H.
Simplified relation between thermodynamics and molecular distribution functions.
J. Chem. Phys. 21, 934-5 (1953).

Theoretical; pair distribution functions; cluster integral; binary liquid mixtures; compressibility; chemical potential; statistical mechanics; thermodynamics

1086. Zimm, B. H., R. A. Oriani and J. D. Hoffman.
Cooperative aspects of phase transitions.
Ann. Rev. Phys. Chem. 4, 207-32 (1953).

Theoretical; REVIEW; phase transition; liquid-vapor; critical point; critical phenomena.

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A Gibbs ensemble locally in equilibrium and its connection with the theory of fluctuation and transfer phenomena. [Russian].
Dokl. Akad. Nauk. SSSR 162, 532-5 (1965).
Dokl. Sov. Phys. Proc. Acad. Sci. USSR 10, 452-4 (1965).

Theoretical; statistical mechanics; critical point; fluctuations

1088. Zwanzig, Robert W., John G. Kirkwood, Kenneth F. Stripp and Irwin Oppenheim. Radial distribution functions and the equation of state of monatomic fluids. J. Chem. Phys. 21, 1268-71 (1953); Errata: J. Chem. Phys. 22, 1625 (1954).

Theoretical; radial distribution function; Lennard-Jones potential; equation of state; critical point; critical isotherm; critical constants; liquid-vapor; isothermal compressibility

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ABSTRACTS

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Journal of Chemical Physics (1959 - 1967)

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Zeitschrift für physikalische Chemie (Frankfurt) (1950 - 1965)

Zhurnal Eksperimental´noi i Teoreticheskoi, SSSR (1955 - 1963, 1966 - 1967)

Zhurnal Fizicheskoi Khimii, SSSR (1959 - 1967)

4. Abbreviations

-A-

Acta Chem. Scand.	Acta Chemica Scandinavica
Acustica (Intern.)	Acustica. International Journal on Acoustics
Advan. Chem. Phys.	Advances in Chemical Physics
Advan. Phys.	Advances in Physics
Akad. Wiss. Lit. (Mainz) Abhandl. Math. - Nat. Kl.	Akademie der Wissenschaften und der Literatur (Mainz), Abhandlungen der Mathematisch--Naturwissenshaftlichen Klasse
Allgem. Wärmetech.	Allgemeine Wärmetechnik
Am. Inst. Chem. Engrs. J.	American Institute of Chemical Engineers Journal
Am. J. Phys.	American Journal of Physics
Am. J. Sci.	American Journal of Science
Anal. Chem.	Analytical Chemistry
Anales Real Soc. Espaň. Fis. Quím. (Madrid)	Anales de la Real Sociedad Española de Fisica y Química (Madrid)
Ann. Acad. Sci. Fennicae	Annales Academiae Scientiarum Fennicae
Ann. Phys. (N. Y.)	Annals of Physics (New York)
Ann. Rev. Phys. Chem.	Annual Review of Physical Chemistry
Appl. Sci. Res. Sec. A	Applied Scientific Research, Section A; Mechanics, Heat, Chemical Engineering, Mathematical Methods
Australian J. Chem.	Australian Journal of Chemistry

-B-

Bull. Acad. Polon. Sci.	Bulletin de l'Academie Polonaise des Sciences
Bull. Chem. Soc. Japan	Bulletin of the Chemical Society of Japan
Bull. Classe Sci., Acad. Roy. Belg.	Bulletin de la Classe des Sciences, Academie Royale de Belgique
Bull. Soc. Chem. Belges	Bulletin des Societes Chimiques Belges

-C-

Can. J. Chem.	Canadian Journal of Chemistry
Can. J. Chem. Eng.	Canadian Journal of Chemical Engineering
Can. J. Phys.	Canadian Journal of Physics
Chem. Eng. Progr.	Chemical Engineering Progress
Chem. Eng. Progr. Symp. Ser.	Chemical Engineering Progress, Symposium Series
Chem. Eng. Sci.	Chemical Engineering Science
Chem.-Ingr.-Tech.	Chemie-Ingenieur-Technik
Chem. Rev.	Chemical Reviews
Chem. Tech. (Berlin)	Chemische Technik, Die (Berlin)
Chem. Weekbald	Chemisch Weekbald
Comm.	Commission
Commun. Math. Phys.	Communications in Mathematical Physics (Germany)
Compt. Rend.	Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences
Conf.	Conference
Contemp. Phys.	Contemporary Physics

-D-

Discussions Faraday Soc.	Discussions of the Faraday Society
Dokl. Akad. Nauk Azerb. SSR	Doklady Akademii Nauk Azerbaidzhanskoi SSR
Dokl. Akad. Nauk SSSR	Doklady Akademii Nauk SSSR

-E-

Econ. Geol. and the Bull. Soc. Economic Geologists	Economic Geology and the Bulletin of the Society of Economic Geologists
Exptl.	Experimental

-F-

Forsch. Gebiete Ingenieurw.	Forschung auf dem Gebiete des Ingenieurwesens
Forschungsh. Ver. Deut. Ingr.	Forschungsheft. Verein Deutscher Ingenieure

-H-

Helv. Phys. Acta	Helvetica Physica Acta

-I-

Ind. Eng. Chem.	Industrial and Engineering Chemistry
Intern.	International
Inzh -Fiz. Zh., Akad. Nauk Belorussk-SSR	Inzhenerno-Fizicheskii Zhurnal, Akademiya Nauk Belorusskoi SSR
Izv. Akad. Nauk Kaz. SSR., Ser. Energ.	Izvestiya Akademii Nauk Kazakhskoi SSR, Seriya Energeticheskaya
Izv. Sektora Fiz-Khim. Analiza, Inst. Obshch. Neorgan. Khim., Akad. Nauk SSSR	Izvestiya Sektora Fiziko-Khimicheskogo Analiza, Institut Obschei i Neorganicheskoi Khimii imeni N. S. Kurnakova, Akademiya Nauk SSSR
Izv. Vysshikh Uchebn. Zavedenii, Fiz.	Izvestiya Vysshikh Uchebnykh Zavedenii Fizika
Izv. Vysshikh Uchebn. Zavedenii, Khim. I Khim. Tekhnol.	Izvestiya Vysshykh Uchebnykh Zavedenii, Khimiya i Khimicheskaya Tekhnologiya
Izv. Vysshikh Uchebn. Zavedenii, Neft i Gaz.	Izvestiya Vysshikh Uchebnykh Zavedenii, Neft i Gaz

-J-

J. Am. Chem. Soc.	Journal of the American Chemical Society, The
J. Appl. Chem. (London)	Journal of Applied Chemistry (London)
J. Appl. Chem. USSR (English Transl.)	Journal of Applied Chemistry of the USSR (English Translation of Zhurnal Prikladnoi Khimii)
J. Chem. Educ.	Journal of Chemical Education
J. Chem. Eng. Data	Journal of Chemical and Engineering Data
J. Chem. Phys.	Journal of Chemical Physics, The
J. Chem. Soc.	Journal of the Chemical Society
J. Chim. Phys.	Journal de Chimie Physique et de Physicochimie Biologique
J. Colloid Sci.	Journal of Colloid Science
J. Franklin Inst.	Journal of the Franklin Institute
J. Gen. Chem. USSR (English Transl.)	Journal of General Chemistry of the USSR (English Translation of Zhurnal Obshchei Khimii)
J. Heat Transfer	Journal of Heat Transfer
J. Imp. Coll. Chem. Eng. Soc.	Journal of the Imperial College Chemical Engineering Society

-J-

J. Math. Phys.	Journal of Mathematical Physics
J. Nat. Sci. Math.	Journal of Natural Sciences and Mathematics, The
J. Phys. Chem.	Journal of Physical Chemistry, The
J. Phys. Colloid Chem.	Journal of Physics and Colloid Chemistry
J. Phys. Radium	Journal de Physique et le Radium, Le
J. Phys. Soc. Japan	Journal of the Physical Society of Japan
J. Polymer Sci.	Journal of Polymer Science
J. Res. Natl. Bur. Std.	Journal of Research of the National Bureau of Standards
J. Tech. Phys. (USSR)	Journal of Technical Physics (USSR)
J. Wash. Acad. Sci.	Journal of the Washington Academny of Sciences
Jena Rev.	Jena Review

-K-

Kriticheskie Yavleniya i Flyuktuatsii v Rastvorakh, Mosk. Gos. Univ., Tr. Soveshch.	Kritcheskie Yavleniya i Flyuktuatsii v Rastvorakh, Moskovskii Gosudarstvennyi Universitet im. M. V. Lomonosova, Trudy Soveshchaniya

-L-

Lab.	Laboratory
LC	Library of Congress

-M-

Mat. Sb.	Mathematicheskii Sbornik
Materialy Ural'sk. Soveshch. po Spektroskopii, Ural'sk. Akad. Nauk SSSR	Materialy Ural'skogo Soveshchaniya po Spektroskopii, Ural'skii Filial Akademii Nauk SSSR, Sverdlovsk, 1958
Mekhanizm i Kinetika Kristallizatsii, Nauchn. Sov. Akad. Nauk Belorussk. SSR po Fiz. Tverd. Tela	Mekhanizm i Kinetika Kristallizatsii, Nauchnyi Sovet Akademii Nauk Belorusskoi SSR po Fizike Tverdogo Tela
Mem. Defense Acad. Math., Phys. Chem. Eng. (Yokosuka) Japan	Memoirs of the Defense Academy, Mathematics, Physics, Chemistry and Engineering (Yokosuka, Japan)
Mem. Fac. Eng., Kyushu Univ.	Memoirs of the Faculty of Engineering, Kyushu Imperial University
Mol. Phys.	Molecular Physics

-N-

NLL	National Lending Library Boston Spa, England
Natl. Bur. Std. Misc. Publ.	National Bureau of Standards (U. S.) Miscellaneous Publication
Nauchn. Ezhegodnik. Chernovitsk. Univ.	Nauchnyi Ezhegodnik Chernovitskogo Universiteta
Ned. Tijdschr. Natuurk.	Nederlands Tijdschrift voor Natuurkunde

-O-

..	..
Osterr. Chemiker-Ztg.	Osterreichische Chemiker-Zeitung
Opt. Spectry. (USSR) (English Transl.)	Optics and Spectroscopy (USSR) (English Translation)
Opt. i Spektroskopiya	Optika i Spektroskopiya
OTS	Office of Technical Sciences, U. S., Department of Commerce

-P-

Pakistan J. Sci. Res.	Pakistan Journal of Scientific Research
Phil. Mag.	Philosophical Magazine, The
Phil. Trans. Roy. Soc. London, Ser. A	Philosophical Transactions of the Royal Society of London, Series A: Mathematical and Physical Sciences
Phys. Fluids	Physics of Fluids
Phys. Letters	Physics Letters
Phys. Rev.	Physical Review, The
Phys. Rev. Letters	Physical Review Letters
Pribory i Tekhn. Eksperim.	Pribory i Tekhnika Eksperimenta
Primenenie Ul'traakustiki k Issled. Veshchestva.	Primenenie Ul'traakustiki k Issledovaniyu Veshchestva
Proc.	Proceedings
Proc. Acad. Sci. USSR, Phys. Chem. Sec.	Proceedings of the Academy of Sciences of the USSR, Physical Chemistry Section
Proc. Natl. Acad. Sci. U. S.	Proceedings of the National Academy of Sciences of the United States of America
Proc. Phys. Soc. (London)	Proceedings of the Physical Society (London)
Proc. Roy. Soc. Edinburgh, Sec. A	Proceedings of the Royal Society of Edinburgh, Section A: Mathematics and Physical Sciences

[continued]

Proc. Roy. Soc. (London) Ser. A	Proceedings of the Royal Society (London) Series A: Mathematical and Physical Sciences
Progr. Theor. Phys. (Kyoto)	Progress of Theoretical Physics (Kyoto)
Pure Appl. Chem.	Pure and Applied Chemistry
	-R-
Rec. Trav. Chim.	Recueil des Travauz Chimiques
Rend. Scuola Intern. Fis. "Enrico Fermi"	Rendiconti della Scuola Internazionale de Fisica "Enrico Fermi"
Rept.	Report, reports
Rept. Progr. Phys.	Reports on Progress in Physics
Rev. Mod. Phys.	Reviews of Modern Physics
Rev. Phys. (Bucharest)	Revue de Physique, Academie de la Republique Populaire Ronmaine
Ric. Sci.	La Ricerca Scientifica
Roczniki Chem.	Roczniki Chemii
Russ. J. Phys. Chem.	Russian Journal of Physical Chemistry
	-S-
SLA	Special Libraries Association
Sov. Phys. - Dokl.	Soviet Physics-Doklady
Soviet Phys. - JETP	Soviet Physics - JETP
Stroenie i Fiz. Svoistva Veshchestva v Zhidkom Sostoyanji, Min. Vysshego i Srednego Spets. Obrazov. Ukr. SSR, Kievsk. Gos. Univ., Materialy 4-go Soveshch.	Stroenie i Fizicheskie Svoistva Veshchestva v Zhidkom Sostoyanii, Ministerstvo Vysshego i Srednego Spetsial'nogo Obrazovaniya Ukrainskoi SSR, Kievskii Gosudarstvennyi Universitet im T. G. Shevchenko, Materialy 4-go Soveshchaniya
Symp.	Symposium

-T-

Teploenerg.	Tepoloenergetika
Teplofiz. Vysokikh Temperatur, Akad. Nauk SSSR	Teplofizika Vysokikh Temperatur, Akademiya Nauk SSSR
Termodinam. i Stroenie Rastvorov. Akad. Nauk SSSR. Otd. Khim. Nauk i Khim. Fak., Mosk. Gos. Univ., Tr. Soveshch.	Termodinamika i Stroenie Rastvorov, Akademiya Nauk SSSR, Otdelenie Khimicheskikh Nauk i Khimicheskii Fakul'tet, Moskovskii Gosudarstvennii Universitet, Trudy Soveshchaniya
Theor.	Theoretical
Tr. Gos. Inst. Prikl. Khim.	Trudy, Gosudarstvennyi Institut Prikladnoi Khim
Tr. Moskov. Energet. Inst.	Trudy, Moskovskogo Energeticheskogo Instituta
Tr., Vses. Nauchno-Issled. Inst. Kislorodn. Mashinostr.	Trudy, Vesesoyuznyi Nauchno-Issledovatel'skii Institut Kislorodnogo Mashinostroeniya
Trans. Faraday Soc.	Transactions of the Faraday Society

-U-

Uch. Zap. Kabardino-Balkarsk. Univ.	Uchenye Zapiski Kabardinskogo-Balkarskogo Universiteta
Uch. Zap. Karbardinsk. Gos. Ped. Inst.	Uchenye Zapiski Karbardinskogo Gosudarstvennogo Pedagogicheskogo Instituta
Uch. Zap., Mosk. Obl. Ped. Inst.	Uchenye Zapiski, Moskovskogo Oblastnogo Pedagogicheskogo Instituta
Uch. Zap., Permsk. Gos. Univ.	Uchenye Zapiski, Permskii Gosudarstvennyi Universitet Imeni A. M. Gorkogo
Cch. Zap., Yakutskogo Gos. Univ. Ser. Estestven. Nauk	Uchenye Zapiski Yakutskogo Gosudarstvennogo Universiteta
Ukr. Fiz. Zh.	Ukrainskii Fizichnii Zhurnal
Ukr. Khim. Zh.	Ukrainskii Khimicheskii Zhurnal
Univ.	University
US At. Energy Comm.	United States Atomic Energy Commission
Usp. Khim.	Uspekhi Khimii
Usp. Fiz. Nauk	Uspekhi Fizicheskikh Nauk

-V-

Vestn. Leningr. Univ. Ser. Fiz. i Khim.	Vestnik Leningradskogo Universiteta Seriya Fiziki i Khimii
Vestn. Mosk. Univ. Ser. Fiz. Astron.	Vestnik Moskovskogo Universiteta, Seriya. Fizika, Astronomiia
Vestn. Mosk. Univ. Ser. Khim.	Vestnik Moskovskogo Universiteta, Seriya II: Khimiya
Visn. Kiivsk Univ. Ser. Astron., Fiz. ta Khim.	Visnik Kiivskogo Universitetu. Seriya Astronomii, Fiziki ta Khimii
Vopr. Sovrem. Fiz. i Mat., Akad. Nauk Uz. SSR	Voprosy Sovremennoi Fiziki i Matematiki, Akademiya Nauk Uzbekskoi SSR
Vses. Konf. Kolloidnoi Khim., Akad. Nauk SSR Otd. Khim. Nauk, Minsk.	Vsesoyuznoi Konferentsii po Kolloidnoi Khimii, Akademiya Nauk, SSSR, Otdelenie Khimicheskikh Nauk, Minsk
Vysokomolekul. Soedin.	Vysokomolekulyarnye Soedineniya

-W-

Wiss. Z. Tech. Hochsh. Chem. Leuna-Merseburg	Wissenschaftliche Zeitschrift der Technischen Hochschule für Chemie Leuna-Merseburg

-Z-

Z. angew. Math. Phys.	Zeitschrift fur angewandte Mathematik und Physik
Z. Elektrochem.	Zeitschrift fur Elektrochemie
Z. Naturforsch.	Zeitschrift fur Naturforschung
Z. Physik.	Zeitschrift fur Physik
Z. physik. Chem. (Frankfurt)	Zeitschrift fur physikalische Chemie (Frankfurt)
Z. physik. Chem. (Leipzig)	Zeitschrift fur physikalische Chemie (Leipzig)
Zh. Eksp. i Teor. Fiz.	Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki
Zh. Fiz. Khim.	Zhurnal Fizicheskoi Khimii
Zh. Obshch. Khim.	Zhurnal Obshchei Khimii
Zh. Prikl. Khim.	Zhurnal Prikladnoi Khimii
Zh. Tekh. Fiz.	Zhurnal Tekhnicheskoi Fiziki

5. Author Index

-B-

-C-

-H-

-K-

-A-

-A-

-B-

-B-

-C-

-C-

-C-

-E-

-E-

-H-

-H-

-I-

-M-

-N-

-P-

-S-

-T-

-T-

-U-

-U-

-V-

-W-

-W-

-X-

-Y-

-Z-

NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards [1] was established by an act of Congress March 3, 1901. Today, in addition to serving as the Nation's central measurement laboratory, the Bureau is a principal focal point in the Federal Government for assuring maximum application of the physical and engineering sciences to the advancement of technology in industry and commerce. To this end the Bureau conducts research and provides central national services in four broad program areas. These are: (1) basic measurements and standards, (2) materials measurements and standards, (3) technological measurements and standards, and (4) transfer of technology.

The Bureau comprises the Institute for Basic Standards, the Institute for Materials Research, the Institute for Applied Technology, the Center for Radiation Research, the Center for Computer Sciences and Technology, and the Office for Information Programs.

THE INSTITUTE FOR BASIC STANDARDS provides the central basis within the United States of a complete and consistent system of physical measurement; coordinates that system with measurement systems of other nations; and furnishes essential services leading to accurate and uniform physical measurements throughout the Nation's scientific community, industry, and commerce. The Institute consists of an Office of Measurement Services and the following technical divisions:

Applied Mathematics—Electricity—Metrology—Mechanics—Heat—Atomic and Molecular Physics—Radio Physics [2]—Radio Engineering [2]—Time and Frequency [2]—Astrophysics [2]—Cryogenics.[2]

THE INSTITUTE FOR MATERIALS RESEARCH conducts materials research leading to improved methods of measurement standards, and data on the properties of well-characterized materials needed by industry, commerce, educational institutions, and Government; develops, produces, and distributes standard reference materials; relates the physical and chemical properties of materials to their behavior and their interaction with their environments; and provides advisory and research services to other Government agencies. The Institute consists of an Office of Standard Reference Materials and the following divisions:

Analytical Chemistry—Polymers—Metallurgy—Inorganic Materials—Physical Chemistry.

THE INSTITUTE FOR APPLIED TECHNOLOGY provides technical services to promote the use of available technology and to facilitate technological innovation in industry and Government; cooperates with public and private organizations in the development of technological standards, and test methodologies; and provides advisory and research services for Federal, state, and local government agencies. The Institute consists of the following technical divisions and offices:

Engineering Standards—Weights and Measures — Invention and Innovation — Vehicle Systems Research—Product Evaluation—Building Research—Instrument Shops—Measurement Engineering—Electronic Technology—Technical Analysis.

THE CENTER FOR RADIATION RESEARCH engages in research, measurement, and application of radiation to the solution of Bureau mission problems and the problems of other agencies and institutions. The Center consists of the following divisions:

Reactor Radiation—Linac Radiation—Nuclear Radiation—Applied Radiation.

THE CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY conducts research and provides technical services designed to aid Government agencies in the selection, acquisition, and effective use of automatic data processing equipment; and serves as the principal focus for the development of Federal standards for automatic data processing equipment, techniques, and computer languages. The Center consists of the following offices and divisions:

Information Processing Standards—Computer Information — Computer Services — Systems Development—Information Processing Technology.

THE OFFICE FOR INFORMATION PROGRAMS promotes optimum dissemination and accessibility of scientific information generated within NBS and other agencies of the Federal Government; promotes the development of the National Standard Reference Data System and a system of information analysis centers dealing with the broader aspects of the National Measurement System, and provides appropriate services to ensure that the NBS staff has optimum accessibility to the scientific information of the world. The Office consists of the following organizational units:

Office of Standard Reference Data—Clearinghouse for Federal Scientific and Technical Information [3]—Office of Technical Information and Publications—Library—Office of Public Information—Office of International Relations.

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[1] Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.
[2] Located at Boulder, Colorado 80302.
[3] Located at 5285 Port Royal Road, Springfield, Virginia 22151.

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JOURNAL OF RESEARCH reports National Bureau of Standards research and development in physics, mathematics, chemistry, and engineering. Comprehensive scientific papers give complete details of the work, including laboratory data, experimental procedures, and theoretical and mathematical analyses. Illustrated with photographs, drawings, and charts.

Published in three sections, available separately:

• Physics and Chemistry

Papers of interest primarily to scientists working in these fields. This section covers a broad range of physical and chemical research, with major emphasis on standards of physical measurement, fundamental constants, and properties of matter. Issued six times a year. Annual subscription: Domestic, $9.50; foreign, $11.75*.

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Studies and compilations designed mainly for the mathematician and theoretical physicist. Topics in mathematical statistics, theory of experiment design, numerical analysis, theoretical physics and chemistry, logical design and programming of computers and computer systems. Short numerical tables. Issued quarterly. Annual subscription: Domestic, $5.00; foreign, $6.25*.

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*** Difference in price is due to extra cost of foreign mailing.**

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