Search results for: chemiluminescence

Total Results: 116

Sort by: Relevancy

Results per page: 50

Ultraviolet CO Chemiluminescence in CH(X\text{2II}) and CH(a\text{4\sigma}) Reactions with Atomic Oxygen at 298 K

Mar 29, 2004 38 pages

Authors: Ghanshyam L. Vaghjiani, ENGINEERING RESEARCH AND CONSULTING INC(ERC INC) EDWARDS AFB CA

Production of ultraviolet CO chemiluminescence has been observed for the first time in the gas-phase pulsed laser photolysis of ... O2) reaction were measured by recording their time-resolved chemiluminescence in discrete vibronic bands. The CO. 4th Positive transition ....2 nm were monitored in this work to deduce the decay kinetics of the chemiluminescence in the presence of various added substrates. From this the second-order rate coefficient .... Measured reactivity trends suggest that the prominent precursors responsible for the chemiluminescence are the methylidyne radicals, CH(X\text{2H}) and CH(a\text{4\sigma}-), ...

THE MECHANISM OF CHEMILUMINESCENCE IN OXIDATIVE REACTIONS IN SOLUTIONS

Oct 21, 1967 16 pages

Authors: K A Allabauo; R F Vasiley; A A Vichutinskiy; I F Rusina; ARMY BIOLOGICAL LABS FREDERICK MD

Topics include: The reaction mechanisms; Measurement of oxidation speed by chemiluminescent methods; The determination of the lifetime of excited states with respect to the quenching of alien substances; The spectra of chemiluminescence; An estimation of radiation yield upon intensifying chemiluminescence via luminophores; The identification of the excited state; The secondary processes in chemiluminescent solutions; The nature of the special connection between chemiluminescence and oxidation.

A Review of Experimental Measurement Methods Based on Gas-Phase Chemiluminescence.

Nov 1972 43 pages

Authors: Arthur Fortin; Dan Golomb; Jimmie A. Hodgeson; PURDUE UNIV LAFAYETTE IND PROJECT SQUID

Measurement methods based on gas-phase chemiluminescence have found extensive use in a wide variety of disciplines such as homogeneous and heterogeneous reaction dynamics, aeronomy, analytical chemistry and air pollution (source and ambient atmospheric monitoring). Chemiluminescence intensity measurements are used to determine reactant and/or product concentrations from which are ... are discussed in the context of their specific applications. The majority of the report concerns itself with chemiluminescence used in air pollution monitoring and chemical release studies in the upper atmosphere.

CHEMILUMINESCENCE IN SOLUTIONS

Nov 30, 1967 56 pages

Authors: R F Vasiley; ARMY BIOLOGICAL LABS FREDERICK MD

The purpose of the work is to give a synopsis of the present condition of research of the mechanism of chemiluminescence and to discuss future developments in this field of physical chemistry. The synopsis is concerned with liquid-phase systems, but the other aspects of chemiluminescence are briefly touched upon in it.

CHEMILUMINESCENCE IN ORGANIC COMPOUNDS

Aug 5, 1984 23 pages

Authors: Heinz Stork; ARMY BIOLOGICAL LABS FREDERICK MD

The energy of the radiation emitted in chemiluminescence originates from a chemical reaction; it may be interpreted as the reversal of a photochemical reaction: in the same manner as the radiation absorbed in a photochemical process will entail a chemical reaction, the analogous is true in reverse in the case of chemiluminescence where radiation is a consequence of a chemical reaction.

Electrogenerated Chemiluminescence

Jun 1988 10 pages

Authors: Allen J. Bard; TEXAS UNIV AT AUSTIN

Electrogenerated chemiluminescence (ECL) has been investigated in a variety of systems under various conditions. Eleven completed publications plus one manuscript in preparation address the following areas: 1. ECL of novel inorganic complexes. 2. ECL from peroxyoxalate/... 4. ECL at polymer modified electrodes. 5. Electroluminescence at semiconductor electrodes. 6. ECL from systems containing no added luminescer. 7. Inverse photoemission from metal electrodes. Keywords: Electrogenerated chemiluminescence, Metal electrodes, Electroluminescence, Micelle systems, Semiconductor electrodes. (mjn)

Gel State Chemiluminescence: An Artificial Electron Transport System

Jan 1988 5 pages

Authors: R F Vasiley; ARMY BIOLOGICAL LABS FREDERICK MD

Electrogenerated chemiluminescence (ECL) has been investigated in a variety of systems under various conditions. Eleven completed publications plus one manuscript in preparation address the following areas: 1. ECL of novel inorganic complexes. 2. ECL from peroxyoxalate/... 4. ECL at polymer modified electrodes. 5. Electroluminescence at semiconductor electrodes. 6. ECL from systems containing no added luminescer. 7. Inverse photoemission from metal electrodes. Keywords: Electrogenerated chemiluminescence, Metal electrodes, Electroluminescence, Micelle systems, Semiconductor electrodes. (mjn)
A Symposium on Bioluminescence and Chemiluminescence

Authors: J. W. Hastings, HARVARD UNIV CAMBRIDGE MA

This grant provided travel and subsistence for scientists to attend and report research findings at the 9th International Symposium on Bioluminescence and Chemiluminescence, held at the conference facilities of the Marine Biological Laboratory, Woods Hole, MA from October 4 to 8, 1996. There were 256 persons registered and 169 abstracts submitted, all of which were published in the Journal of Bioluminescence and Chemiluminescence. The program was organized to have no parallel sessions except for one afternoon on education, so all attendees were able to attend all ...
Some Characteristics of Riboflavin Chemiluminescence

Authors: Richard D. Tower; Harold A. Neufeld; Philip B. Shevin; FORT DETRICK FREDERICK MD

Data are presented that describe some characteristics of riboflavin chemiluminescence in the dark in the presence of hydrogen peroxide and osmium trichloride. The reaction, in terms of the light intensity produced, is affected by type of buffer, pH, and concentration of reactants. Light intensity is directly proportional to the concentration of riboflavin, and a 1,000-fold increase in relative light intensity is produced when osmium is present. The optimum pH for the reaction in phosphate buffer is 8.0 and in sodium hydroxide, 12. Spectral studies of the riboflavin chemiluminescent reaction ...

Ultrasensitive Infrared Chemiluminescence Detection

Authors: W. T. Rawlins; M. E. Fraser; K. W. Holtclaw; W. J. Marinelli; H. C. Murphy; PHYSICAL SCIENCES INC ANDOVER MA

... Additional experimental measurements in a discharge-flow reactor quantified the kinetics and spectroscopy of energetic IR precursor species including metastable electronic states of molecular oxygen, molecular nitrogen, and atomic nitrogen. Results from the experimental measurements were included in a critical review of nitric oxide kinetics, and were applied to predictive modeling of nitric oxide excitation in the auroral upper atmosphere. Infrared emission, Chemiluminescence, Nitrogen, Nitric oxide Molecular dynamics, Vibrational excitation, Atmospheric background, Mesospheric chemistry

Sulfur Chemiluminescence Detection Compared to Sulfur Flame Photometric Detection

Authors: Michael W. Elizy; L. G. Janes; EDGWOOD RESEARCH DEVELOPMENT AND ENGINEERING CENTER ABERDEENPROVING GROUND MD

Detection of compounds containing sulfur heteratom is traditionally accomplished using flame photometric detection (FPD). Sulfur chemiluminescence detection (SCD) is an alternative to FPD. This report compares the FPD with two SCD configurations using various sulfur containing compounds as probes. Attention was focused on detector linearity versus response.

An Evaluation of the Eclox Chemiluminescence Test, Hach Pesticide/Nerve Agent Test Strips, and Agri-Screen Test Tickets

Authors: David E van der Trader; William H Schalie; ARMY CENTER FOR ENVIRONMENTAL HEALTH RESEARCH FORT DETRICK MD

The United States Army Center for Environmental Health Research (USACEHR) has developed an Environmental Sentinel Biomonitor (ESB) system to test Army drinking water supplies for the presence of toxic industrial chemicals (TICs). One of the technologies considered for inclusion in the ESB system was the Eclox Chemiluminescence Test, which, along with the Pesticide/Nerve Agent (P/NA) Test Strip is available as part of the Hach Eclox Rapid Response Water Toxicity Kit. The Eclox test and P/NA Test Strips are simple, rapid tests with sturdy packaging and materials, and the reagents used are stable ...

Chemiluminescence Chemical Detection of Vapors and Device.

Authors: Gregory E. Collins; Susan L. Rose-Pehrsson; DEPARTMENT OF THE NAVY WASHINGTON DC

Phase chemical sensor includes a polymer film which has a chemiluminescent reagent immobilized therein. The polymer film and chemiluminescent reagent are chosen to significantly enhance the selectivity of the sensor to the analyte in the gaseous phase to which the sensor is exposed. The sensor is then positioned so that, when exposed to the gaseous mixture, any chemiluminescence generated will be detected by a photomultiplier tube or other photodetector, such as a photodiode. The sensor is particularly useful in the detection of O2, N2H4, SO2, NO2, and halogenated hydrocarbons. jg p40

Substituted Hydrazine Chemistry and Chemiluminescence in High Altitude Plumes.

Authors: Ralph H. Kummer; Edward P. Fisner; Frederick P. Bovitt; PHYSICAL DYNAMICS INC DETROIT MICH

Hydrazine and amine based fuels are shown to undergo highly exothermic oxidation reactions which can be a major source of infrared energy under conditions appropriate to high altitude plume afterburning. In low pressure, high oxygen atom environments, a single step, highly exothermic mechanism is capable of initiating the emission
of infrared radiation. A specific set of reactions and energy transfer processes which characterize this potential emission are presented and an extensive review of the current literature related to amine oxidation is included. A flow field calculation directed ...
Investigations of Chemiluminescence in the CH2 + O Gas Phase Reaction

Authors: Ghanshyam L. Vaghjiani, ENGINEERING RESEARCH AND CONSULTING INC, EDWARDS AFB, CA

The reaction of ketene (C2H2O) in a known excess of O-atoms was studied in a discharge flow-tube apparatus. Characteristic CO-chemiluminescence was observed in the range 130-900 nm. The rate coefficient for this reaction was determined to be \((6.82 \pm 1.02) \times 10^{-13}\) cm³ molecule\(^{-1}\) s\(^{-1}\) at 295 K by recording the relative strength of the steady-state 216-nm Cameron emission as a function of the reaction length in the flow-tube. The band structure of the emission spectrum recorded suggests that the subsequent very rapid reaction of O-atoms with the product C2O and possibly with the remaining ketene was also observed. In this only case, the chemiluminescence signal is very small for the reactions of the iodomethanes (if we except the CH3IF and similar radicals explaining the very low branching ratio in these reactions. Although the chemiluminescence emitters considered in the study are OH and ... flame burner. The study shows that the chemiluminescence yield behaves linearly with flow rate ...

Investigations of Chemiluminescence in the CH2 + O Gas Phase Reaction

Authors: Ghanshyam L. Vaghjiani, ENGINEERING RESEARCH AND CONSULTING INC, EDWARDS AFB, CA

The reaction of ketene (C2H2O) in a known excess of O-atoms was studied in a discharge flow-tube apparatus. Characteristic CO-chemiluminescence was observed in the range 130-900 nm. The rate coefficient for this reaction was determined to be \((6.82 \pm 1.02) \times 10^{-13}\) cm³ molecule\(^{-1}\) s\(^{-1}\) at 295 K by recording the relative strength of the steady-state 216-nm Cameron emission as a function of the reaction length in the flow-tube. The band structure of the emission spectrum recorded suggests that the subsequent very rapid reaction of O-atoms with the product C2O and possibly with the remaining ketene was also observed. In this only case, the chemiluminescence signal is very small for the reactions of the iodomethanes (if we except the CH3IF and similar radicals explaining the very low branching ratio in these reactions.

Dynamics of HF(v,J) Chemiluminescence and Lasing by Infrared Hyperspectral Imaging

Authors: S. J. Davis, W. T. Rawlins, D. B. Oakes, G. Dadusc, D. X. Hammer, PHYSICAL SCIENCES INC, ANDOVER, MA

This paper presents results from a continuing investigation of mixing flowfields and optical gain profiles in HF chemical laser systems by infrared hyperspectral imaging. Chemiluminescent F + H2 reacting flowfields and chemical laser output beams are imaged at a series of wavelengths, 2.6 to 2.9 microns, by a low-order, spectrally scanning Fabry-Perot interferometer mated to an infrared camera. The resulting hyperspectral data cubes define the spectral and spatial distributions of the emission. High-resolution images can be processed to determine spatial distributions of the excited state ...

Effect of Equivalence Ratio and G-Loading on In-Situ Measurements of Chemiluminescence in an Ultra Compact Combustor

Authors: Jason M. Armstrong, AIR FORCE INST OF TECH, WRIGHT-PATTERSON AFB, OH, SCHOOL OF ENGINEERING AND MANAGEMENT

Using a spectrometer and high temperature fiber optics the relative intensities of the near-infrared, visible, and ultraviolet radiation emitted from the C2*, CH*, and OH* radicals were measured at eight discrete locations within the Ultra Compact Combustor test rig. Blackbody radiation in the near infrared also was observed. The tests were conducted at various g-loadings and overall equivalence ratios and with various air hole configurations. These measurements were compared to determine the effect of these changes on the radiation emitted. Local C2* intensities were used to estimate the ...

An Experimental Examination of the Relationship between Chemiluminescent Light Emissions and Heat-release Rate Under Non-Adiabatic Conditions

Authors: L. C. Haber, U. Vandsburger, W. R. Saunders, V. K. Khanna, VIRGINIA POLYTECHNIC INST AND STATE UNIV, BLACKSBURG, DEPT OF MECHANICAL ENGINEERING

In an effort to move in this direction using chemiluminescence as the measured quantity, this paper examines the formation of premixed flames under non-adiabatic conditions. The main chemiluminescence emitters considered in the study are OH and ... flame burner. The study shows that although the chemiluminescence observed in the two burners behaves very ... , the variation can be fully understood. OH chemiluminescence is found to be a good indicator of heat-release in both ... rate. Based on the experimental results, the notion that chemiluminescence yield behaves linearly with flow rate ...

Propellant Aging Research

Authors: Douglas B. Olson, Robert J. Gill, AEROCHEM RESEARCH LABS, INC, PRINCETON, NJ

Propellant aging research resulting from chemical degradation of this series of propellant mixtures by reactive gases was also ... demonstrate the capabilities of the real-time NOx offgas analysis technique and the polymer chemiluminescence technique. Keywords: Propellant aging; Energetic materials; Kinetics.

Crossed Beam Studies of Some Chemiluminescent Reactions Producing IF

Authors: D. Khalil, N. Billy, G. Gouedard, J. Vigue, ECOLE NORMALE SUPERIEURE, PARIS, FRANCE

... studies which were made under flow conditions, we have used a crossed-beam experiment. In these conditions, the chemiluminescence signal is very small for the reactions of the iodomethanes (if we except the particular case of CH4 ... due to iodine impurity), but this signal is considerably larger for HI. In this only case, the spectrum of the chemiluminescence was recorded, which shows that the emitter is well IF in its B state. This mechanism involves ... by steric arguments in the case of the CH3IF and similar radicals explaining the very low chemiluminescence branching ratio in these reactions.
Aging of Polymers and Composites
Authors: C. J. Wolf, D. L. Fanter, M. A. Greymon; MCDONNELL DOUGLAS RESEARCH LABS ST LOUIS MO
Jul 21, 1981
74 pages

CHEMILUMINESCENT MATERIALS
Authors: AMERICAN CYANAMID CO STAMFORD CT
Feb 29, 1984
Chemiluminescence is discussed with primary reference to the C2O2C2-H2O2-fluorescent acceptor
chemiluminescent reaction, chemiluminescent decomposition of anthracene photoperoxides, synthetic
approaches to new potentially chemiluminescent compounds, and energy transfer in chemiluminescent...acid
decompositions are reported. A stable, solid chemiluminescent composition based on oxalic acid is described.
Emitting species in peroxoxyacetic acid chemiluminescence were shown to be the singlet excited state of the
fluorescent acceptor present in the system. Preliminary energy transfer studies in the ...

CHEMILUMINESCENT MATERIALS
Authors: M. M. Rauhut; R. C. Hirt; AMERICAN CYANAMID CO STAMFORD CT
Feb 28, 1985
Chemiluminescence is discussed with primary reference to the C2O2C2-H2O2-fluorescent acceptor
chemiluminescent reaction, chemiluminescent decomposition of anthracene photoperoxides, synthetic
approaches to new potentially chemiluminescent compounds, and energy transfer in chemiluminescent...
adecompositions are reported. A stable, solid chemiluminescent composition based on oxalic acid is described.
Emitting species in peroxoxyacetic acid chemiluminescence were shown to be the singlet excited state of the
fluorescent acceptor present in the system. Preliminary energy transfer studies in the ...

CHEMILUMINESCENT SYSTEMS
Authors: John S. Driscoll; J. A. Pirog; A. W. Berger; MONSANTO RESEARCH CORP EVERETT MA
Feb 23, 1987
Chemiluminescence is discussed with primary reference to the C2O2C2-H2O2-fluorescent acceptor
chemiluminescent reaction, chemiluminescent decomposition of anthracene photoperoxides, synthetic
approaches to new potentially chemiluminescent compounds, and energy transfer in chemiluminescent...
adecompositions are reported. A stable, solid chemiluminescent composition based on oxalic acid is described.
Emitting species in peroxoxyacetic acid chemiluminescence were shown to be the singlet excited state of the
fluorescent acceptor present in the system. Preliminary energy transfer studies in the ...

CHEMILUMINESCENT MATERIALS.
Authors: William M. Lee; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING
Nov 1964
Progress in determining mechanisms of processes fundamental to chemiluminescence is reported with
particular reference to (1) studies of oxalyl peroxide chemiluminescence (2) studies of new, potentially useful,
chemiluminescent reactions related to oxalyl peroxide decompositions, and (3) synthesis and exploratory studies
of new potentially chemiluminescent systems.

CHEMILUMINESCENT MATL
Authors: Ts M Avakyan; N S Adzhyan; ARMY BIOLOGICAL LABS FREDERICK MD
Nov 1964
Progress in determining mechanisms of processes fundamental to chemiluminescence is reported with
particular reference to (1) studies of oxalyl peroxide chemiluminescence (2) studies of new, potentially useful,
chemiluminescent reactions related to oxalyl peroxide decompositions, and (3) synthesis and exploratory studies
of new potentially chemiluminescent systems.

CHEMILUMINESCENT SYSTEMS
Authors: John S. Driscoll; J. A. Pirog; A. W. Berger; MONSANTO RESEARCH CORP EVERETT MA
Feb 23, 1987
The report describes a device which makes it possible to record chemiluminescence of biosubstrates under the
simultaneous effects of various gases, temperature and X-rays. By using this apparatus it is possible to maintain
a pressure of up to 30 atmospheres in the recording chamber. This makes it possible to trace the oxygen effect,
the temperature coefficient, chemiluminescence and to work with various protectors in X-ray work.

THE LUMINESCENCE OF LUMINOL XI
Authors: K. Weber; V. Mikulovic; ARMY BIOLOGICAL LABS FREDERICK MD
Aug 12, 1964
The report describes a device which makes it possible to record chemiluminescence of biosubstrates under the
simultaneous effects of various gases, temperature and X-rays. By using this apparatus it is possible to maintain
a pressure of up to 30 atmospheres in the recording chamber. This makes it possible to trace the oxygen effect,
the temperature coefficient, chemiluminescence and to work with various protectors in X-ray work.

Collisional Energy Transfer Mechanisms between Singlet Oxygen and Iodine Monofluoride
Authors: William M. Lee; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING
Dec 1986
Collisional energy transfer mechanisms were observed from iodine Monofluoride (IF) excited by singlet oxygen in a gas flow tube
reactor as a means to study the 02-IF energy transfer mechanisms. Although several researchers have
demonstrated singlet oxygen's ability to efficiently pump IF(X) to the IF(B) state, the exact details of the
processes have not been determined. The purpose of this research was to conduct IF(B) chemiluminescence
spectral analysis and O2(1 sigma)- quenching experiments to further define the excitation processes and to
develop plausible mechanistic models based on experimental results. The ...

Correction of Gain and Optical Throughput Variations in a Two- Dimensional Imaging Spectrometer
Authors: C. A. Monning; B. D. Gebhart; Gary M. Hieftje; INDIANA UNIV AT BLOOMINGTON DEPT OF CHEMISTRY
Oct 28, 1988
Correction of Gain and Optical Throughput Variations in a Two-Dimensional Imaging Spectrometer
Authors: C. A. Monning; B. D. Gebhart; Gary M. Hieftje; INDIANA UNIV AT BLOOMINGTON DEPT OF CHEMISTRY
Oct 28, 1988
The purpose of this research was to conduct IF(B) chemiluminescence spectral analysis and O2(1 sigma)- quenching experiments to further define the excitation processes and to
develop plausible mechanistic models based on experimental results. The ...

... alternative approaches have been explored for such normalization, the method described in this paper is novel in its
effectiveness and simplicity. In this approach, a chemiluminescence substance is introduced into a flat
sample cell whose dimensions are large enough to ensure uniform coverage of the photodetector array of
interest. Because the chemiluminescence solution is homogeneous, it can be used to uniformly irradiate the
imaging detector; recording of the resulting image then indicates any variations that exist across ...

**Annual Report on Office of Naval Research Grant N00014-86-G-0147 (Moss Landing Marine Laboratories)**

Dec 14, 1989 30 pages

Authors: Edward J. Green; MOSS LANDING MARINE LABS CALIF

... chemicals in situ. We have developed a method for the determination of manganese that is based on its catalysis of the oxidation of 7,7,8,8-tetracyanoquinodimethan. The chemiluminescence produced by this reaction allows us to detect manganese at concentrations down to 0.1 nM with no significant interferences in seawater. ... in the coastal zone and in deep-sea hydrothermal vent plumes. Oxidation of brilliant sulfoflavine in the presence of iron(II) generates chemiluminescence, which can be used to determine iron concentrations to concentrations of at least 0.3 nM. Total iron concentrations can be ...

**Investigation of Combustion in Large Vortices**

Aug 15, 1990 13 pages

Authors: Edward E. Zukoski; CALIFORNIA INST OF TECH PASADENA

... combustion in vortex structures. Large vortices were formed utilizing pulsed flow over a downstream facing step. The technique for simultaneous shadowgraph, chemiluminescence, and laser doppler velocimeter measurements has been developed and is used regularly. For a pressure oscillation of fixed amplitude, ... grows linearly with time at a rate that increases linearly with the pressure amplitude of the oscillation generating the vortex formation. The onset of chemiluminescence - and we believe combustion - is delayed for several milliseconds, close to our estimates for the chemical time for the ...

**Wide Temperature Range Kinetics of Plume Reactions**

Jun 1998 25 pages

Authors: Arthur Fontijn; RENSSELAER POLYTECHNIC INST TROY NY DEPT OF CHEMICAL ENGINEERING

... for CO formation, by collision- induced curve crossing from CO triplet states. Experiments in the pseudo-static reactor have confirmed the increase of the CO chemiluminescence intensity with pressure, as indicated by this mechanism, but show a decrease in the intensity of the emission when the C2 + O2 reaction is ... emission and may be a more important reaction for rocket exhausts. As the first step toward obtaining the absolute light intensities and chemiluminescence efficiencies for the C2 + O2 reaction, its vuv emission is used to obtain its overall rate coefficients, k(300-976 K) = 1.8x10EXP( ...

**Investigations of the CO-Chemiluminescence in the Reaction of Ketene With Excess Oxygen Atoms**

2000 1 pages

Authors: Ghanshyam L. Vaghjiani; AIR FORCE RESEARCH LAB EDWARDS AFB CA PROPULSION DIRECTORATE WEST

... such as CH(A 2 delta) in C2H plus O or O2, and OH(A 2 Sigma plus) in CH + O2 reactions are also possible. CO-uv chemiluminescence has previously been identified in C2H + O2 reaction and both CO-uv and CO-vuv in the C2O + O reaction. However, no information is available on ... in CH and CH2 reactions has not yet been positively identified. Fast discharge-flow tube and pulsed-laser photolysis methods have been employed in this work to study the reaction kinetics and chemiluminescence in the ketene plus O-atom flame. The experimental approach used and the results obtained will be presented.