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Perchlorate



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[Surface Science for Advanced Propulsion](#)

Aug 1996

313 pages

Authors: [Kevin P. Chaffee](#); [John J. Rusek](#); [PHILLIPS LAB EDWARDS AFB CA](#)

Full Text

... propulsion materials. Before the principal author joined the project, the primary focus of the program was on the ammonium **perchlorate** (AP)/bonding agent interaction. As the propellant community sought to lower hydrochloric acid (HCl) ...): an exciting candidate material for structural applications and the subject of current research. Ammonium **perchlorate** presents a challenge because of its delicate, reactive nature as revealed by its low ... /mole. Ion and electron beam techniques were found to be too damaging to either the ammonium **perchlorate** substrate and/or the organic bonding agent overlayer.

[The Synthesis and Characterization of Methylene Bisoxamine CH₂\(-O-NH₂\)₂](#)

Feb 14, 2001

27 pages

[2 Salts](#)

Authors: [Kerri Tollison](#); [Greg Drake](#); [Tom Hawkins](#); [Adam Brand](#); [Milton McKay](#); [ENGINEERING RESEARCH AND CONSULTING INC EDWARDS AFB CA](#)

Full Text

... methylene bisoxamine, CH₂(-O-NH₂)₂, a dibasic, geminal oxyamine of methane. Single salts including the nitrate, **perchlorate**, dinitramide, and nitroformate, and doubly protonated methylene bisoxamine salts, nitrate, **perchlorate** and bisdinitramide, were all synthesized in good to high yields, from simple acid-base reactions with ... 1H, 13C), and DSC studies. The single crystal X-ray diffraction study was carried out on the double **perchlorate** salt. Initial safety studies (impact and friction), were carried out on most of the new ...

[Optimizing of In Situ Bioremediation Technology to Manage Perchlorate-Contaminated Groundwater](#)

Mar 2003

112 pages

Authors: [Mark R. Knarr](#); [AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING](#)

Full Text

... given site conditions. In particular, a project manager desires to design a system that: 1) maximizes **perchlorate** destruction; 2) minimizes treatment expense; and 3) attains regulatory limits on down gradient contaminant ... donor, and injection schedule) that optimize the first two objectives noted; to maximize **perchlorate** destruction while minimizing cost. Four optimization runs are performed, using two different ... of site conditions. Results from all four optimization runs indicate that the relationship between **perchlorate** mass removal and operating cost is positively correlated and nonlinear.

[Modeling In Situ Bioremediation of Perchlorate-Contaminated Groundwater](#)

Mar 2007

126 pages

Authors: [Roland E. Secody](#); [AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT](#)

Full Text

... developed which uses dual-screened treatment wells to mix an electron donor into perchlorate-contaminated groundwater in order to effect in situ bioremediation of the **perchlorate** by indigenous **perchlorate** reducing bacteria without the need to extract the contaminated water from the subsurface. In this study, a model that ... project. A genetic algorithm was used with the first 113 days of data to derive a set of best-fit parameters to describe **perchlorate** reduction kinetics for the electron donor, citrate, utilized in the evaluation study. The calibrated parameter values were then used to predict ...

[Development of a Screening Model for Design and Costing of an Innovative](#)

[Tailored Granular Activated Carbon Technology to Treat Perchlorate-Contaminated Water](#)

Mar 2007

144 pages

Authors: [William C. Powell](#); [AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT](#)

Full Text

Perchlorate contamination of drinking water is a problem that has recently gained national attention. The purpose of this research was to develop a tool to predict ... was developed using GAC design principles and using a multi-component Freundlich isotherm to describe sorption of **perchlorate** on T-GAC, in the presence of competing anions. Data from laboratory column experiments were used to obtain model ... of competing ions. T-GAC appears to be a viable technology to treat perchlorate-contaminated water when the **perchlorate** concentrations are low and competing ion concentrations are not significant.

[Development of Environmental Data for Navy, Air Force, and Marine Munitions](#)

Jun 2007

60 pages

Authors: [Jay L. Clausen](#); [Constance Scott](#); [Randall J. Cramer](#); [ENGINEERING RESEARCH AND DEVELOPMENT CENTER](#)

[HANOVER NH COLD REGIONS RESEARCH AND ENGINEERING LAB](#)

... and drinking water sources. The extent to which major energetic constituents (RDX, HMX, TNT, and **perchlorate**) are present at military installations is being analyzed and assessed. Studies of the presence of energetic materials on US ... in the continental United States involves use of munitions containing quantities of RDX, HMX, TNT, and **perchlorate** comparable to Army usage on an annual basis. Based on field studies of numerous Army ranges, there is a high probability of introduction of RDX, HMX, TNT, and **perchlorate** residues into the environment at Air Force, Navy, and Marine ranges as well.

[Full Text](#)[INVESTIGATION OF THE MECHANISM OF SOLID PROPELLANT BURN RATE](#)

Jan 1967

108 pages

Authors: [David A. Flanigan](#); [MORTON THIOKOL INC HUNTSVILLE AL HUNTSVILLE DIV](#)

... were designed to study the interaction, if any, between catalysts and oxidizer and binder indicate the following conclusions. Thermal decomposition of ammonium **perchlorate** under pressure occurs in a single-phase step instead of the three phases observed at atmospheric pressure. The single-phase decomposition step of ammonium **perchlorate** is shifted to lower temperature in the presence of iron oxide. The degree of this shift is dependent upon Fe₂O₃ concentration. The autoignition temperature of composite ...

[Full Text](#)[RESEARCH ON CHARACTERISTICS OF TRANSITION ELEMENTS IN SOLUTION. 1. STUDIES ON RHODIUM CHEMISTRY. WITH A NOTE ON PALLADIUM. 2. STUDIES ON RUTHENIUM CHEMISTRY](#)

Feb 1963

88 pages

Authors: [Clara Berecki-Biedermann](#); [Derek C. Lewis](#); [Felipe Brito](#); [ROYAL INST OF TECH STOCKHOLM \(SWEDEN\)](#)

Systematic studies were made on the preparation and characterization of halogenide-free rhodium sulfate and **perchlorate** solutions. Improved methods of preparation and analysis were worked out. Some redox emfs for Rh (III, V) mixtures are given. They do not correspond to real ... the apparent standard electrode potential in 0.5 - 1 M HClO₄ is around 1.42 V. Absorption spectra are given for the solution prepared. Pure palladium(II) **perchlorate** and sulfate solutions were prepared by precipitating first - with HClO₄ hydrous palladium oxide from a clear alkaline solution of Pd(NO₃)₂ and then dissolving ...

[Full Text](#)[DEVELOPMENT OF MAGNESIUM WAFER CELLS](#)

Feb 1968

30 pages

Authors: [Lloyd W. Eaton](#); [BURGESS BATTERY CO FREEPORT IL](#)

... air is causing the anode to be attacked on the contact (non-reactive) side to an excessive degree and that the anode in a flat cell needs complete protection on the non-reactive side. Magnesium **perchlorate** cathode material seems to intensify the action on the non-reactive side of the anode and there is a strong suggestion that the rubber hydrochloride cell wrap is being degraded by the oxidizing nature of the **perchlorate** at 160F. causing leakage and the destruction of the batteries stored at 160F.

[Full Text](#)[Chemical and Physical Characterization of an Experimental White Smoke Formed from Combustion of Ammonium Perchlorate, Ammonium Chloride, and Carboxy-Terminated Polybutadiene](#)

Oct 26, 1992

20 pages

Authors: [James C. Eaton](#); [Joseph A. Terra](#); [Jennifer L. Hornsby](#); [Alan T. Rosencrance](#); [Ernst E. Brueggemann](#); [ARMY BIOMEDICAL RESEARCH AND DEVELOPMENT LAB FORT DETRICK MD](#)

... by the U.S. Army Chemical Research, Development and Engineering Center (USACRDEC) as a candidate to replace hexachloroethane smoke systems, consists of ammonium **perchlorate** (62 percent by weight) and ammonium chloride (20 percent) in a matrix of carboxy- terminated polybutadiene (18 percent). Miniature grenades provided by ... of ammonium chloride particles with a mass median diameter of 1 micrometers. Ammonium chloride is regarded as a mild respiratory irritant... Smoke, Ammonium **perchlorate**, Ammonium chloride, Polybutadiene, Hydrogen chloride, Carbon monoxide, PAH, Health effects, Exposure.

[Full Text](#)[Ionic and Molecular Environments in Heterogeneous Electrocatalysis: Studies by Radioactive Labeling and LEED/AUGER Spectroscopy](#)

Jul 1993

45 pages

Authors: [Andrzej Wieckowski](#); [ILLINOIS UNIV AT URBANA DEPT OF CHEMISTRY](#)

... gold, or an ultra-thin metallic film of either cadmium, copper or silver obtained via underpotential deposition processes. The adsorbates predominantly included bisulfate, **perchlorate**, phosphate, acetic acid and urea. The integrative feature of the adsorbates was their capacity of a reversible adsorption on the platinum electrode. The molecule with which the catalytic rates have been measured was methanol in **perchlorate**, bisulfate and phosphate solutions. These studies have focused on (1) effects of anions on the catalytic oxidation of methanol on platinum single ...

[Full Text](#)[A SNIFTIRS Study of the Diffuse Double Layer at Single Crystal Platinum Electrodes in Acetonitrile](#)

May 26, 1995

39 pages

Authors: [Nebojsa S. Marinkovic](#); [Mathias Hecht](#); [John S. Loring](#); [W. R. Fawcett](#); [CALIFORNIA UNIV DAVIS DEPT OF CHEMISTRY](#)

In situ reflection infrared spectroscopy with electrochemical modulation has been used to investigate the structure of the double layer for the system: Pt(hkl)/acetonitrile. The electrolytes used were tetraethylammonium **perchlorate** and sodium **perchlorate**. It has been found that acetonitrile is preferentially chemisorbed on the surface either through the non-bonding electrons on the nitrogen atom at potentials positive of the point of zero charge, or on its side in a rehybridized form at negative potentials. The transition between these orientations can be followed by the present technique. The ...

[Full Text](#)[Recognition by New Pyridino-18-crown-6 Ligands Containing Two Methyl, Two t-Butyl or Two Allyl Substituents on Chiral Positions Next to the](#)

May 1996

13 pages

[Pyridine Ring for the Enantiomers of Chiral Organic Ammonium Perchlorates](#)

Authors: [Yoichi Habata](#); [Jerald S. Bradshaw](#); [J. J. Young](#); [Steven L. Castle](#); [Peter Huszthy](#); BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMISTRY

[Full Text](#)

The log K values for the interaction of new chiral pyridino-18-crown- 6 ligands containing two substituents on chiral positions next to the pyridine ring with the enantiomers of *o*-phenylethylammonium **perchlorate** (PhEt) and *a*-(1- naphthyl)ethylammonium **perchlorate** (NapEt) were measured using a (1)H NMR titration method in a CDCl₃/CD₃OD (1/1) solvent mixture. The log K values indicate that these chiral pyridino-18-crown-6 ligands have high complexing abilities and ...

[Studies of the Electrochemical Double Layer at Au\(100\) in Perchloric Acid](#)

May 26, 1996

15 pages

[Solutions by In Situ Infrared Spectroscopy](#)

Authors: [Nebojsa S. Marinkovic](#); [Juan J. Calvente](#); [Zuzana Kovacova](#); [W. R. Fawcett](#); CALIFORNIA UNIV DAVIS DEPT OF CHEMISTRY

[Full Text](#)

In situ infrared reflection spectroscopy has been used to probe the concentration change of the **perchlorate** anion in the electrical double layer at Au(100). The results obtained show clearly that there is a correlation between the integrated intensity of the **perchlorate** band determined in a (SNIFTIRS) experiment and the surface excess of the anion in the diffuse layer predicted by the Gouy-Chapman theory. An expression that correlates the above two quantities is derived.

[DOD Operational Ranges: More Reliable Cleanup Cost Estimates and a Proactive Approach to Identifying Contamination Are Needed](#)

May 2004

55 pages

Authors: GENERAL ACCOUNTING OFFICE WASHINGTON DC

[Full Text](#)

For decades, the Department of Defense (DOD) has tested and fired munitions on millions of acres of operational ranges. These munitions contain various constituents such as lead, trinitrotoluene (TNT), and ammonium **perchlorate** salt (**perchlorate**) that are, in some instances, known or suspected of causing health effects such as damage to the central and peripheral nervous systems, cancer, and interfering with thyroid function. Concerns about the potential cost to clean up munitions prompted Congress to require that DOD develop an estimate for what it would cost to clean up its operational ranges ...

[Using Human Life Stage PBPK/PD Model Predictions of Perchlorate-Induced Iodide Inhibition to Inform Risk Assessment in Sensitive Populations](#)

Feb 2006

11 pages

Authors: [David R. Mattie](#); [Teresa R. Sterner](#); [Elaine A. Merrill](#); [Rebecca A. Clewell](#); HENRY M JACKSON FOUNDATION FOR THE ADVANCEMENT OF MILITARY MEDICINE ROCKVILLE MD

[Full Text](#)

... PBPK/PD models. The human perinatal models successfully simulate literature radioiodide data for gestation and lactation, as well as data from populations exposed to **perchlorate** contaminated drinking water. These validated models were used to examine the effect of developmental stage on susceptibility to thyroid ... a range of doses. At environmentally relevant doses, the perinatal woman, fetus and nursing infant are predicted to have higher blood **perchlorate** concentrations and greater thyroid iodide uptake inhibition than either the non-pregnant adult or older child. At exposure levels equal to ...

[Ionic Liquids as Energetic Materials](#)

Mar 2007

75 pages

Authors: [Jeanne M. Shreeve](#); IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

[Full Text](#)

... positive heats of formation, densities approaching 2 g/cm³, and apparently low sensitivities. Heterocyclic rings (containing amino, nitro or azido substituents) paired with nitrate, **perchlorate**, dinitramide, or picrate anions form highly energetic salts which may be more environmentally acceptable (**perchlorate** excepted). Additionally, high energy salts in which both the cation and anion are high-nitrogen species, e.g., azolium, substituted azolium, guanidinium, bridged ...

[Development of a Screening Tool to Facilitate Technology Transfer of an Innovative Technology to Treat Perchlorate-Contaminated Water](#)

Mar 2008

145 pages

Authors: [Daniel A. Craig](#); AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH DEPT OF SYSTEMS AND ENGINEERING MANAGEMENT

[Full Text](#)

Perchlorate contamination of drinking water is a significant problem nationwide. The purpose of this study was to develop a tool to predict the cost and performance of tailored granular activated carbon (T-GAC), an innovative technology that is being ... the transfer and commercialization of innovative technologies. In the study, a model was developed to predict T-GAC performance and life-cycle costs for removing **perchlorate** under varying influent water quality and technology operating conditions. The model's design parameters were obtained from laboratory rapid small-scale column tests (RSSCTs) ...

[POLAROGRAPHIC REDUCTION OF HEXAMMINECOBALT \(III\) ION. THE EFFECT OF NONCOMPLEXING ELECTROLYTES](#)

Jan 5, 1953

29 pages

Authors: [H. A. Laitinen](#); [A. J. Frank](#); [P. Kivalo](#); ILLINOIS UNIV AT THE MEDICAL CENTER CHICAGO COLL OF DENTISTRY

[Full Text](#)

The formation of a Co(OH) sub 2 film was postulated to explain the dips appearing in the diffusion current region of the first reduction wave of Co(NH sub 3) sub 6 (3+) in **perchlorate**, chloride, and nitrate solutions. The film did not form after the addition of 0.02% gelatin, or with an increased concentration of the supporting electrolyte. The effects of various salts and of pH on the film formation are discussed. The addition of a small amount of Co(2+) during the reduction of Co(NH sub 3) sub 6 (3+) in the presence of aquated Co(2+) did not cause an addition to the second wave; Co(2+) was ...

THERMAL DECOMPOSITION OF ALKALI METAL CHLORATES

Jan 1953

75 pages

Authors: [JOHN C. PERNERT](#); [OLDBURY ELECTRO-CHEMICAL CO NIAGARA FALLS NY](#)

... same results. KClO sub 3 was converted to a mixed salt containing 68% KClO sub 4, 9% KClO sub 3, and 23% KCl with an optimum efficiency of 83%. The conversion process was more difficult to control than that with NaClO sub 3. NaClO sub 3-KCl mixtures produced **perchlorate** at higher conversion efficiencies than KClO sub 3; the highest efficiency was 88.4%. Fused quartz and Vycor were almost inert catalytically when in contact with chlorates under conversion conditions. Metallic surfaces promoted adverse catalysis. Some alloys were passivated to behave like quartz. NaCl in the conversion product was ...

Full Text**THE DETERMINATION AND DISTRIBUTION OF ORGANIC PHOSPHORUS IN SEA WATER. PART 1. THE DETERMINATION OF ORGANIC PHOSPHORUS IN SEA WATER WITH PERCHLORIC ACID OXIDATION**

Nov 1952

29 pages

Authors: [ANDREW L. HANSEN](#); [REX J. ROBINSON](#); [WASHINGTON UNIV SEATTLE](#)

A method is proposed for determining the organic P content in sea water by which the organic material is oxidized with HClO sub 4 and the organic P is converted to phosphate. HClO sub 4 was a better medium for oxidation than H sub 2 SO sub 4 in 2 respects: (1) the **perchlorate** salts formed upon the digestion of sea water were more readily H sub 2 O-soluble, and (2) HClO sub 4 required a smaller blank correction for impurities. By heating the samples with concentrated HCl, arsenic interference through the volatilization of the chloride was prevented. Total P was determined colorimetrically; ...

Full Text**PAD PROPELLANTS FOR USE AT HIGH TEMPERATURES. PART II - EXPOSURE OF NITRATE ESTER PROPELLANTS TO HIGH TEMPERATURES, AND BALLISTIC FEASIBILITY OF COMPOSITE PROPELLANTS IN PAD CARTRIDGES**

Oct 1965

52 pages

Authors: [Martin Visnov](#); [FRANKFORD ARSENAL PHILADELPHIA PA COMPONENTS ENGINEERING DIRECTORATE](#)

... in the M-73 PAD Cartridge/M-3 Initiator system and by estimation of weight loss, change in nitrogen content of nitrocellulose, gas evolution, and grain deformation. The propellants degraded rapidly at 225 and 250 F, and would not survive 275 F for evaluation. The ballistic feasibility of substituting composite propellants for nitrate esters in PAD cartridges was demonstrated in the M-73 cartridge. Composite propellants employing ammonium **perchlorate** oxidizer performed satisfactorily in the M-73 Cartridge/M-3 Initiator system at -65 F, but were marginal after two hours' exposure at 400 F.

Full Text**ELECTROCHEMISTRY OF FUEL CELL ELECTRODES**

Apr 27, 1962

23 pages

Authors: [A. I. Mlavsky](#); [TYCO LABS INC WALTHAM MA](#)

... an electronegative element from groups IV-B, V-B, and VI-B of periodic tables, were synthesized and evaluated as electrode materials. NiO, NiS, NiAs, NiSb, NiSi and elemental nickel in the massive form have been studied in N₂, O₂ and H₂ atmospheres in both alkaline and acid **perchlorate** media. Anodic and cathodic polarization measurements were made. Polarization was pronounced at moderate current densities. Participation of O₂ and H₂ was poor and the corrosion reactions was prominent. The cathodic hydrogen evolution reaction on these electrodes is discussed. The use of palladium as a support ...

Full Text**ALKYLATING AGENTS CONTAINING A QUARTERNARY NITROGEN GROUP (1): RELATIVE NUCLEOPHILICITY METHYLATION OF ANIONS IN AQUEOUS MEDIA (2)**

Jun 27, 1969

13 pages

Authors: [Joseph Epstein](#); [Harry O. Michel](#); [Jr. Hackley Brennie E.](#); [A. B. Ash](#); [P. Blumbergs](#); [EDGEWOOD ARSENAL ABERDEEN PROVING GROUND MD](#)

... contain an alkylsulfonate group as the alkylating function and a quarternary ammonium salt group attached to a hydrocarbon backbone. Alkylation rate data were obtained for 16 anion nucleophiles in aqueous media at 25C (and 37C) and constant salt concentration using 1-methyl-3-(methylsulfonate) pyridinium **perchlorate** as the alkylating agent substrate. The data at 25C are presented in terms of log k₂/k_w and the Swain and Scott equation is employed to obtain the substrate constant, s (0.715). Nucleophilic constants, n, are calculated and compared with published values for 12 anions, and new ...

Full Text**Studies of the Ignition and Combustion of Boron Particles for Air - Augmented Rocket Applications**

Oct 1974

106 pages

Authors: [Merrill K. King](#); [Andrej Macek](#); [ATLANTIC RESEARCH CORP ALEXANDRIA VA COMBUSTION AND PHYSICAL SCIENCE DEPT](#)

... containing boron, and to study its ignition and combustion characteristics, especially as compared to the known information for pure boron. Section II of the present report describes (a) the rocket-motor firing program in which the condensed exhaust (CE) from two different composite ammonium **perchlorate** propellants was collected, and (b) the results of thermodynamic computations for these formulations. Sections III and IV contain the results of the physical (microscopy, density measurement) and chemical analyses of the CE. Section V deals with combustion of the CE. Finally, Sections VI and ...

Full Text**System Evaluation of Solid Chemical Oxygen Generators**

Mar 1975

28 pages

Authors: [Edward B. Thompson Jr.](#); [AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OH](#)

... candle) oxygen generation is a candidate among the alternative systems being considered. This effort concerned the test and performance evaluation of two basic types of chlorate candle oxygen generators while operating in a laboratory system console. The two candle formulations were compared for oxygen producing capacity, flowrate, and ignitability. System data on candle generator temperature and accumulator pressure was also recorded. The results of the effort established that sodium chlorate candle ignition and performance were

Full Text

more consistent and superior to lithium **perchlorate** candles.

[Toxicity to Aquatic Organisms and Chemistry of Nine Selected Waterborne](#)

May 1975

98 pages

[Pollutants from Munitions Manufacture - A Literature Evaluation](#)

Authors: [Dickinson Burrows](#); [Jack C. Dacre](#); [ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT LAB FORT DETRICK MD](#)

Full Text

... chemistry of nine military-relevant compounds was evaluated and reviewed. The selected compounds, munitions manufacturing products of potential concern as water-borne pollutants, are dinitrotoluene, tetryl and picric acid, trinitroresorcinol and lead styphnate, pentaerythritol tetranitrate, nitroguanidine, tetracene, potassium **perchlorate**, red phosphorus and strontium salts. Based on the available toxicity data, recommendations were made for further investigations to be conducted on the first seven of the listed compounds. No further toxicity studies have been proposed for red phosphorus and ...

[Detonation of Rapidly Dispersed Powders in Air](#)

Jun 18, 1982

14 pages

Authors: [David C. Heberlein](#); [ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND FORT BELVOIR VA](#)

Full Text

... an indication of the performance of FAE weapons against these mines. The detonation of dispersed powders does not share the limitation in maximum overpressures found for the liquid fuel-air systems. Solid powders such as explosive powders and combinations of flaked aluminum and ammonium **perchlorate**, carry their own oxygen at the molecular level for efficient combustion during detonation. The maximum pressures attainable in powdered, dispersed solid systems that carry molecular oxygen is easily related to the density of explosive, the energy available for combustion and the detonation velocity. ...

[Decontamination of Casualties from Battlefield Under CW and BW Attack](#)

Nov 15, 1984

85 pages

Authors: [Robert E. Lyle](#); [Henry F. Hamil](#); [Edward P. McGovern](#); [David A. Trujillo](#); [SOUTHWEST RESEARCH INST SAN ANTONIO TX](#)

Full Text

... products of the DECP were detected. Reactive monomers of vinyl benzyl chloride were grafted onto polyethylene films and converted to quaternary salts. The anion of these salts was exchanged to give highly nucleophilic hydroxide, azide, or thiosulfate salts. Oxidative anions such as permanganate chromate, **perchlorate**, chlorate, or hypochlorite were also formed. These films had low capacity for decontamination but could be treated with indicators to form detection films. Polymers having the diethylene triamine side chain were prepared. Attempts to prepare a polymeric form of DS-2 (a sodium ...

[Characterization of Rocket Propellant Combustion Products. Chemical](#)

[Characterization and Computer Modeling of the Exhaust Products from Four Propellant Formulations](#)

Dec 31, 1990

129 pages

Authors: [R. A. Jenkins](#); [C. W. Nestor](#); [C. V. Thompson](#); [T. M. Gayle](#); [C. Y. Ma](#); [OAK RIDGE NATIONAL LAB TN](#)

Full Text

... compositions were evaluated. CO levels ranged from 85 - 350 ppm, while particle concentrations ranged from 30 - 100 mg/meters cubed. All of the airborne particles were in the inhalable range. For two of the propellants, airborne lead was greater than mg/meters cubed. For the predominantly **perchlorate** formulation, hydrogen chloride (HCl) levels were greater than 100 ppm. Particulate PAH levels were about a factor of 10 lower than that in outside ambient air particulate matter. The computer model predicted mole fractions for CO were typically 20 - 35%, except for the predominantly inorganic ...

[A Mu-Pyrazolyl Terpyridineplatinum\(II\) Dimer](#)

Aug 1992

6 pages

Authors: [J. A. Bailey](#); [H. B. Gray](#); [CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING](#)

Full Text

μ -(Pyrazolyl-N:N')-bis(2,2',2''-terpyridine)platinum(II) **perchlorate** acetonitrile solvate, Pt₂(Cl₅HIIN₃)₂(C₃H₃N₂)(ClO₄)₃.CH₃CN, M(sub r) = 1263.18, orthorhombic, Pnma a = 18.172 (2), b = 17.950 (3), c = 12.086 (4) Å, V = 3942.3 (15) Å³, Z = 4, D (sub x) = 2.128 g/cm³, λ(Mo K(α)) = 0.71073 Å, μ = 74.41 /cm, F (000) = 2416, room temperature (297K), R = 0.0337 for 2510 reflections with F(2) sub omicron > 3 sigma (F(2) sub omicron). A single pyrazolyl unit bridges two Pt centres. The square-planar coordination around each Pt atom is completed by a tridentate terpyridine ligand. The ...

[Electron Diffusion Coefficients in Hydrogels Formed of Cross-Linked Redox](#)

Jan 26, 1993

22 pages

[Polymers](#)

Authors: [Atsushi Aoki](#); [Adam Heller](#); [TEXAS UNIV AT AUSTIN DEPT OF CHEMICAL ENGINEERING](#)

Full Text

...) for the redox polymer POs-EA, an ethylamine quaternized poly(vinylpyridine) complex of Os(bipyridine)₂Cl₂, has been directly measured by steady-state voltammetry at interdigitated array (IDA) electrodes. In cross-linked POs-EA De decreased upon increasing the ionic strength and upon changing the hydrophilic chloride counterion to the hydrophobic **perchlorate** anion. In 5.0 wt% cross-linked POs-EA De is pH dependent increasing from 4.5 x 10⁻⁹ to 1.6 x 10⁻⁸ cm² sec⁻¹ as the pyridine rings are protonated. In highly (25 wt%) cross-linked POs-EA, the motion of the chains is restricted, De is ...

[Enantiomeric Recognition of Chiral Organic Ammonium Salts by a Chiral](#)

Mar 17, 1993

14 pages

[Dimethyl\(Allyloxybenzo\)Pyridino-18-Crown-6 Macrocycle](#)

Authors: [J. S. Bradshaw](#); [P. Huszthy](#); [T.-m. Wang](#); [C.-y. Zhu](#); [R. M. Izatt](#); [BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMISTRY](#)

Chiral dimethyl(allyloxybenzo) pyridino-18-crown-6 was prepared for possible attachment to silica gel. The synthetic sequence requires the preparation of chiral dimethyl-substituted 2,6-bis(hydroxyethoxymethyl)pyridine. Macrocycle 9 did not interact with an organic ammonium salt. Chiral allyloxydimethylpyridino-18-crown-6, on the

Full Text other hand, exhibited good recognition for one of the enantiomers of chiral alpha-(1-naphthyl)ethylammonium **perchlorate**.

Pi-Pi Interaction in the Complexes of the Pyridino-18-Crown-6 Host

Molecules and Aromatic Ammonium Salts as Determined by H NMR

Mar 19, 1993

10 pages

Spectroscopy

Authors: [T.-m. Wang](#); [J. S. Bradshaw](#); [J. C. Curtis](#); [P. Huszthy](#); [R. M. Izatt](#); [BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMISTRY](#)

Full Text Significant pi-pi interaction is found in the complexes of (SS)- dimethylpyridino-18-crown-6 with (R)- and (S)- ALPHA-(1-Naphthyl)ethylammonium **perchlorate**. This finding is supported by the 1H NOESY NMR spectral technique, greater chemical shift changes of aromatic protons in both host and guest molecules upon complexation, and by molecular mechanics calculations.

Enantiomeric Separation of Chiral Organic Ammonium Salts by Chiral

Pyridino-18-Crown-6 Ligands

Mar 17, 1993

14 pages

Authors: [Peter Huszthy](#); [Jerald S. Bradshaw](#); [Reed M. Izatt](#); [BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMISTRY](#)

Full Text A chiral dimethylpyridino-18-crown-6 ligand was attached to silica gel by first forming an allyloxy-substituted crown. This material was treated with triethoxysilane and then coated and covalently attached to silica gel. This report shows the synthesis of the silica gel-bound chiral crown and its use in separating alpha-(1-naphthyl) ethylammonium **perchlorate** into its (R)- and (S)- forms.

Quantitation of Enantiomeric Recognition in Chiral Crown Ether-Ammonium

Salt Systems

Mar 17, 1993

7 pages

Authors: [C.-y. Zhu](#); [R. M. Izatt](#); [T.-m. Wang](#); [P. Huszthy](#); [J. S. Bradshaw](#); [BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMISTRY](#)

Full Text ... in host-guest chemistry involving macrocycles has been due in no small part to the availability of reliable and extensive thermodynamic data for a large number of host-guest systems. Although valuable information concerning these systems can be derived from delta H and delta S values, few calorimetric data have been reported for host-guest systems. This report summarizes the log K, delta H, delta S, and delta log K values for the interaction of a number of chiral 18-crown-6 host molecules for the enantiomers of alpha-(1-naphthyl) ethylammonium and alpha-(phenyl)ethylammonium **perchlorate** salts.

The Structures of the Chiral Dimethylpyridino-18-crown-6-alpha-(1- naphthyl)

ethylammonium Perchlorate Complex as Determined by T1 Relaxation and

Mar 17, 1993

12 pages

Molecular Modeling

Authors: [T.-m. Wang](#); [J. S. Bradshaw](#); [J. C. Curtis](#); [R. M. Izatt](#); [BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMISTRY](#)

Full Text The flexibility of the complexed ligand causes C relaxation times of all periphery carbons to drop without significant selectivity. Rotational energy barrier measurements of the methyl groups of the complexed ligand also show that the (SS)-host-(R)-guest is the more stable complex.

The Effect of Alkyl Substituents on the Macrocyclic Ring on Enantiomeric

Recognition by Chiral Pyridino-18-Crown-6 for 1-Naphthylethylamine

May 20, 1993

15 pages

Authors: [J. K. Hathaway](#); [L.-y. Zhu](#); [P. Huszthy](#); [J. S. Bradshaw](#); [R. M. Izatt](#); [BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMISTRY](#)

Full Text This paper discusses the effect that various dialkyl substituents on chiral pyridino-18-crown-6 ligands have on the molecular recognition of these ligands for the (R) and (S)-(alpha-(1-naphthyl)ethyl) ammonium **perchlorate**. We have systematically synthesized the necessary chiral pyridino-18-crown-6 macrocycles and determined the extent of molecular recognition by titration calorimetry. This paper also discusses possible mechanisms of recognition. (Author)

Ion Modulated Electroactivity in Thin Film Metallopolymers

Apr 18, 1994

11 pages

Authors: [Joseph T. Hupp](#); [L. A. Lyon](#); [Mark A. Ratner](#); [NORTHWESTERN UNIV EVANSTON IL DEPT OF CHEMISTRY](#)

Full Text Electroactivity in thin-film redox polymers derived from Fe(2, 2'bipyridine)3(3+/2+) and Fe(phenanthroline)3 (3+/2+) can be tremendously modulated by replacing conventional counter ions (such as **perchlorate**) with alkylsulfonates (CH3(CH2) nSO3, n=0-11). With large n species, the amount of charge passed during metal oxidation decreases (reversibly) by nearly an order of magnitude, while the rate of charge flow (as measured transiently by chronocoulometry) similarly decreases, again reversibly. Redox thermodynamic effects (systematic shifts in film-based formal potentials) are also seen. The ...

Thermodynamic and NMR Studies of Solvent Effect on Enantiomeric

Recognition for a Chiral Organiz Ammonium Cation by Chiral Diketopyridino-

May 11, 1994

19 pages

18- Crown-6 Type Ligands at 25.0 deg C

Authors: [Xian X. Zhang](#); [Reed M. Izatt](#); [Cheng Y. Zhu](#); [Jerald S. Bradshaw](#); [BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMISTRY](#)

Full Text Three chiral diketopyridino-18-crown-6 type macrocycles have been shown to exhibit a high degree of enantiomeric recognition toward alpha-(1- naphthyl)ethylammonium **perchlorate** (NapEt) in various ratios of chloroform/ methanol (CDCl3/CD3OD) and 1,2-dichloroethane/methanol (C2H4Cl2/CH3OH) solvent mixtures (from 100% to 10% methanol component). In most cases differences in log K values (delta(log) K) for (R)- and (S)-NapEt complexation with the chiral macrocycles are larger than 0.5. The degree of the enantiomeric

recognition indicated by the delta(log) K value changes noticeably with the binary ...

[Ion Modulated Electroactivity in Thin-Film Polymers Derived from Bipyridyl and Phenanthroline Complexes of Iron](#)

Jun 10, 1994

17 pages

Authors: [L. A. Lyon](#); [Mark A. Ratner](#); [Joseph T. Hupp](#); [NORTHWESTERN UNIV EVANSTON IL DEPT OF CHEMISTRY](#)

Profound changes in the metal-centered electroactivity of thin-film redox polymer/electrolyte systems accompany the replacement of a conventional electrolyte solution (aqueous tetraethylammonium **perchlorate**) by any of several aq. CH₃(CH₂)SO₃-Na(+) solutions. For example for a poly-Fe(4-methyl-4'-vinyl-2, 2'-bipyridine)₃m⁺ film in contact with an aq. sodium decanesulfonate solution: (a) the overall redox capacity decreases by roughly half an order of magnitude, (b) the rate of hopping-based electron transport during charging decreases by 20-fold, and (c) the thermodynamic potential for ...

Full Text

[Lithium Ion Aqueous Cells](#)

Feb 1995

19 pages

Authors: [Edward J. Plichta](#); [Wishvender K. Behl](#); [ARMY RESEARCH LAB FORT MONMOUTH NJ](#)

Lithium ion aqueous cells were investigated using lithium intercalating compounds as anodes and cathodes. The aqueous electrolyte consisted of 4 to 5 molar solutions of either lithium **perchlorate** or lithium nitrate which contained lithium hydroxide in millimolar amounts to make the solutions slightly basic with a pH of about 8.5. Several electrode combinations were evaluated using lithium intercalating compounds such as lithium cobalt oxide and lithium manganese oxide as cathodes and lithium vanadium oxide, lithium manganese oxide, titanium disulfide, and molybdenum dioxide as the anodes. The ...

Full Text

[Evidence for Specific and Non-Specific Adsorption of ClO₄ on Ag\(110\)](#)

Aug 15, 1995

21 pages

Authors: [A. Krasnopoler](#); [E. M. Stuve](#); [UNIV OF WASHINGTON SEATTLE](#)

The coadsorption of ClO₄ with H₂O on Ag(110) was studied as a model of anion adsorption at the solid-liquid interface. Thermal desorption spectroscopy, low energy electron diffraction, and high resolution electron energy loss spectroscopy were used to investigate the interactions between **perchlorate**, water and the metal surface. The vibrational spectrum of adsorbed ClO₄ is an indicator of its adsorption geometry. For ClO₄ adsorbed on the clean surface, losses at 640, 915, 1020 and 1220 /cm indicate that adsorption occurs through three oxygen atoms (tridentate) with a symmetry of C_{3v} or lower. ...

Full Text

[High Pressure NMR and Electrical Conductivity Studies of Gel Electrolytes Based on Poly\(acrylonitrile\)](#)

Jan 26, 1996

21 pages

Authors: [Charles A. Edmondson](#); [Mary C. Wintersgill](#); [John J. Fontanella](#); [Furio Gerace](#); [Bruno Scrosati](#); [CITY UNIV OF NEW YORK DEPT OF PHYSICS](#)

The effect of high pressure on electrical conductivity and NMR in gels prepared from lithium or sodium **perchlorate**, ethylene carbonate, dimethyl carbonate and poly(acrylonitrile) (PAN) has been determined. The corresponding liquids were also studied. Complex impedance studies at frequencies from 10 to 10 (exp -8) Hz and NMR measurements of T₁ were carried out as a function of pressure up to 0.25 GPa. Activation volumes for NMR relaxation and ionic conductivity were calculated from the variable pressure data. Both activation volumes were found to be approximately the same in the liquids. For ...

Full Text

[Conductivities of Lithium Tris\(trifluoromethanesulfonyl\) Methide in Aqueous and Nonaqueous Solutions at 25 degree C](#)

Feb 1996

18 pages

Authors: [Charles W. Walker Jr.](#); [Mark Salomon](#); [ARMY RESEARCH LAB FORT MONMOUTH NJ](#)

... The results show that according to the ability of the solvents to solvate lithium ion, ion pair formation is small or non-existent in solvents with high donor number (water, PC, DMF and AN) but fairly moderate, in nitromethane. Single ion molar conductivities at infinite dilution for **perchlorate**, hexafluoroarsenate, hexafluorophosphate, triflate, imide and methide anions, obtained by combining our results with literature data, decrease as expected as the ionic radius increases, and with one exception are always greater than that of the lithium ion. This general trend does not however apply in ...

Full Text

[Model of Chlorocarbon \(CFC-12\) Chemisorption on Solid Rocket Motor Alumina Exhaust Particles](#)

Dec 1995

142 pages

Authors: [Gary E. Lund](#); [AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH](#)

Solid Rocket (SRMs) that power Titan IV rockets and Space Shuttles, exhaust large quantities of potentially ozone damaging pollutants directly into the stratosphere, while in powered flight. In the past, studies on potential stratospheric impact of the exhaust products from aluminum/ammonium **perchlorate** based SRMs have focused on the effect of gaseous HCl from SRMs on the stratosphere. Until recently, the impact of heterogeneous chemistry on stratospheric ozone was believed to be relatively insignificant. This research investigates the potential heterogeneous process of CFC-12 dissociative ...

Full Text

[Energetics of Late Chemical Reactions in Nonideal Underwater Detonations: Phase 1, Preliminary Theoretical Model Development](#)

Oct 1995

75 pages

Authors: [Michael Cowperthwaite](#); [D. J. Pastine](#); [Julius W. Enig](#); [ENIG ASSOCIATES INC SILVER SPRING MD](#)

... and thermo- hydrodynamic processes that define the nonideal detonation of a totally nonideal explosive: an AP/Al mixture. Section 2 presents a thermo-hydrodynamic description of reactive explosive compositions containing aluminum and, in particular, a description of the nonideal detonation process in ammonium **perchlorate**/aluminum and CHNO explosive/Al compositions. The specific energy relationships for these reacting compositions were formulated with each component governed by its own equations of state. Mie-Gruneisen equations of state are derived, including the temperature, and used for the ...

Full Text

[Chiral Pyridine-Based Macrobicyclic Clefts: Enantiomeric Recognition of Chiral Organic Ammonium Salts](#)

May 1996

12 pages

Authors: [Paul C. Heller](#); [Jerald S. Bradshaw](#); [J. J. Young](#); [Xian X. Zhang](#); [Reed M. Izatt](#); [BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMISTRY](#)

Full Text

... a pyridine ring (1) formed a complex at 25 deg C in 50% CH₃OH/50% CHCl₃(v/v), with a primary ammonium salt (log K= 3.15) as evidenced by a significant change in the (1)H NMR spectrum. Highly organized pyridine-containing macrobicyclic (S,S,S,S)-2 exhibited recognition at 25 deg C in 20% C₂H₅OH/80% 1,2-C₂H₄Cl₂ (v/v) for the (S) enantiomer of alpha- (1-naphthyl)ethylammonium perchlorate (NapEt) over its (R) form (delta log K= 0.85). This high recognition factor probably reflects an increase in molecular rigidity by the introduction of a second macroring on the monocyclic pyridinocrown ligand.

[Study of Metal Agglomeration and Combustion](#)

1996

46 pages

Authors: [Valery Babuk](#); [BALTIC STATE TECHNICAL UNIV ST PETERSBURG \(RUSSIA\)](#)

Full Text

This report includes the results of the experimental investigation of the CCP properties close to the burning SRP surface depending on the oxidizer (ammonium perchlorate) dispersity at two levels of pressure. The morphological and chemical properties of agglomerates and HDO particles have been determined in the work. The obtained data has been analyzed and made it possible to determine more precisely the regularities in the CCP formation. A potential use of propellant structure model in solution of the problem dealing with predicting the CCP parameters close to the burning propellant has been ...

[Developmental Toxicity Screen of Ammonium Dinitramide Using Hydra attenuata](#)

Nov 1996

29 pages

Authors: [R. E. Wolfe](#); [E. R. Kinkead](#); [P. D. Confer](#); [ARMSTRONG LAB BROOKS AFB TX OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIRECTORATE](#)

Full Text

The immediate application for the propellant ammonium dinitramide (ADN) is as a clean burning replacement for ammonium perchlorate in a formulation that also gains in performance. Currently, Air Force personnel are working with ADN during field testing trials. Reproductive toxicity evaluation of ADN through use of a modified Screening Information Data Set study using Sprague-Dawley rats produced adverse effects on litter parameters of treated animals. An in vitro developmental toxicity screen was performed to determine the developmental hazard index (A/D ratio) for ADN using the hydra assay. ...

Total Results: 133

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