Effects Of Ozone Oxidation On Carbon Black Surfaces | b49fb597f55b1297201f6e0c5aeeabee

Long-Term Effects of Disinfection Changes on Water QualityInventory of Federal Energy-related Environment and Safety Research for A Comprehensive Assessment of the Effects of Ozone and UV Radiation on the Molecular Weight and Optical Properties of Natural Water and Wastewater Effluent Dissolved Organic MatterSelected Bibliography on Ozone, Its Biological Effects and Technical ApplicationsOxidation of Water Supply Refractory Species by Ozone with Ultraviolet RadiationAir Pollution AbstractsCarbon-Containing Polymer CompositesChemistry of Ozone in Water and Wastewater TreatmentLaboratory Ozonation of Municipal WastewatersOzone in Food ProcessingAn Ultrasound Catalyzed Ozone Oxidation Process Feasibility Study for the Destruction of TNT and Other Explosives in Aqueous SolutionEnvironmental Effects of Ozone DepletionPesticide Removal by Combined Ozonation and Granular Activated Carbon FiltrationImpact of Ozone Exposure on OPV EfficiencyOzonation of Erythromycin and the Effects of PH, Carbonate and Phosphate Buffers, and Initial Ozone DoseEvolution of Acidic Functional Groups on Biochars by Ozone Oxidation to Improve Performance as a Soil AmendmentChemical OxidationCurrent Developments in Biotechnology and BioengineeringEnvironmental Health PerspectivesInternational Symposium on the Biomedical Effects of Ozone and Related Photochemical OxidantsTropospheric OzonePersonal Care Products in the Aquatic EnvironmentAdvances in Wastewater Treatment IIIn Vitro Effects of Ozone on Enveloped Animal VirusThe Effects of Ozonation Pathways on the Formation of Ketoacids and Assimilable Organic Carbon (AOC) in Drinking WaterMeasuring Oxidants and Oxidative Stress in Biological SystemsTropospheric OzoneAtmospheric Ozone VariabilityScientific and Technical Aerospace ReportsOzone in Nature and PracticeEvaluation of an Air Stripping-Ozone Contactor SystemSelected Water Resources AbstractsOzone and Plant CellPhytochemical Effects of Environmental CompoundsChemistry of Ozone in Water and Wastewater TreatmentOzoneKinetic Isotope Effects in the Oxidation of Silanes by Mercuric Acetate, Thallium Triacetate, and OzoneThe effects of ozone on mammalian cell cultures and viruses in vitroThe Mechanisms of Reactions Influencing Atmospheric OzoneOzone in Water Treatment

Long-Term Effects of Disinfection Changes on Water Quality ABSTRACT: The work presented concentrations on better understanding the physical and chemical properties of dissolved organic matter (DOM) in two distinctly different aquatic environments. More specifically, examining the degradation of DOM before and after oxidation treatments with ozone, ultra violet radiation (UVR), and combination of the two. DOM consists of low and high molecular weight species such as humic substances, hydrophilic acids, carboxylic acids, amino acids, carbohydrates, and hydrocarbons [1]. DOM is a component of the carbon cycle, serves as a nutrient source, impacts treatment processes, and plays an important role in the transportation of aquatic contaminates. However, the exact structure of DOM is still not fully understood because of its complex nature and origin. Chapter 1 is a brief introduction to DOM, including its role in natural and wastewater systems. This chapter also discusses the different types of oxidation processes and the interactions of oxidation with DOM. Chapter 2 is a brief introduction to the four analytical techniques that will be used in the analysis of natural water DOM (NDOM) and wastewater effluent DOM (efDOM). The four analytical techniques include: size exclusion chromatography (SEC), time-of-flight mass spectrometry (TOF MS), ultra-violet visible (UV-Vis) absorption spectroscopy, and excitation-emission matrix fluorescence spectroscopy (EEMS). Chapter 3 is understanding DOM in a natural water system. DOM is a key component in freshwater ecosystems, and strongly influences the optical, chemical, and biological environment. Therefore, it becomes important to understand the nature of DOM within this system. Many natural water systems are treated for drinking water purposes at water treatment facilities with the use of chlorine. The formation of hazardous disinfection by-products (DBPs) from the interaction of chlorine with DOM has lead to finding alternative methods for disinfection. The use of ozone, UVR, and the combination of these two will be examined on the degradation and removed of DOM in a natural water system. Chapter 4 is understanding the degradation DOM in a wastewater system after oxidation treatment. Natural water systems are known to be more of terrestrial origin, whereas wastewater is of microbally-derived origin. Therefore, it is important to understand the effects of oxidants in terrestrially-derived and microbally-derived systems. Chapter 5 aims at comparing NDOM and efDOM before and after advanced oxidation treatment (AOP). AOP is the combination of ozone and UVR. More specifically, this research examines two types of AOP treatments: (1) ozone and UVR from an artificial radiation source and (2) ozone and UVR from a natural radiation source. The will be determined which

type of AOP is best suited for the degradation and removal of DOM in both systems and to determine if AOP has the same or different effect of DOM of two distinctly different systems. Four analytical techniques will be used in combination in order to better understand DOM characteristics for the studies performed in chapters 3, 4, and 5. Multimethod analysis will be used to develop a broad view of the DOM characteristics and will aid in revealing similarities and differences in NDOM and efDOM before and after advanced oxidation treatments. These four techniques include: (1) size exclusion chromatography (SEC) to qualitatively and quantitatively understand the molecular weight distribution of DOM, (2) time-of-flight mass spectrometry (TOF MS) to separate DOM based on the mass-to-charge ratio, (3) ultraviolet-visable (UV-Vis) absorption spectroscopy to understand the chromophoric character of DOM, and (4) exitation-emission matrix fluorescence spectroscopy to understand the fluorophoric origin of DOM. Chapter 6 is understanding the effects of microalgae bioremediation on wastewater DOM. Microalgae serve a dual role: they are environmentally-friendly alternatives to disinfection/oxidation of wastewater and produce biomass that can be used as biofuels and feeds. The most suitable conditions for maximum microalgae growth, and therefore maximum biomass and feed production is still largely unknown because microalgae growth depends on factors such as pH and temperature, concentration of essential nutrients, including nitrogen, phosphorus, and organic carbon, availability of light, oxygen, and carbon dioxide. Therefore, it is important to determine where in the treatment process would be suitable for maximum algae growth and greatest degradation of DOM. Two analytical techniques will be used collectively to better understand the interactions of microalgae and DOM-size exclusion chromatography and excitation emission matrix fluorescence spectroscopy.

Inventory of Federal Energy-related Environment and Safety Research for Chemistry of Ozone in Water and Wastewater Treatment book will discuss mechanistic details of ozone reactions as much as they are known to date and apply them to the large body of studies on micropollutant degradation such as pharmaceuticals and endocrine disruptors that is already available.

A Comprehensive Assessment of the Effects of Ozone and UV Radiation on the Molecular Weight and Optical Properties of Natural Water and Wastewater Effluent Dissolved Organic Matter

Selected Bibliography on Ozone, Its Biological Effects and Technical Applications Ozone has an important and irreplaceable function in nature and human society. It preserves life on the Earth by stratospheric ozone layer. On the other hand, the formation of ground-level ozone by reactions of hydrocarbons with nitrogen dioxide in the presence of sunlight has adverse effects on humans and animals as well as on various materials. This book concentrates on the protection of stratospheric ozone and prevention of ground-level ozone formation; applications of its strong oxidizing properties in the treatment of water, wastewater and sludge; odor and color removal; uses in medicine as a disinfectant; and various other ozone therapies. It also deals with catalytic ozonation in water treatment, control methods for ozone applications on biological systems, various areas of ozone use in dental care, follow-up therapy and prevention.

Oxidation of Water Supply Refractory Species by Ozone with Ultraviolet Radiation Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database.

Air Pollution Abstracts The latest generation of modular shelter, power, and health care equipment for Army field hospitals is termed the MUST: Medical Unit, Self-Contained, Transportable. Supporting the MUST-equipped hospital is a Water Processing Element (WPE) designed to treat non-sanitary hospital wastewater for reuse. Treatment train processes of the WPE are hydraulic equalization, ultrafiltration, reverse osmosis (RO), ultraviolet (UV) activated ozone oxidation, and hypochlorination. A nominal one-quarter scale UV-ozone contactor was evaluated at the US Army Medical Bioengineering Research and Development Laboratory. The contactor, built by Life Systems, Inc., of Cleveland, OH, consisted of six sparged columns in series preceded by an ozone scrubber or precontactor. The contactor was evaluated using a synthetic clinical hospital RO permeate. Evaluation included defining the fluid regime inside the columns, investigating the effectiveness of pre-stripping, and monitoring the oxidation of selected laboratory wastewater components throughout the oxidation process as well as measuring TOC and COD. A correlation between the TOC stripping rate constant and oxygen mass transfer coefficient was developed in cooperation with the University of Illinois. Effects of ozone concentration and UV light on the kinetics and mechanisms of organic

carbon oxidation were explored.

Carbon-Containing Polymer Composites Ozone, an important trace component, is critical to life on Earth and to atmospheric chemistry. The presence of ozone profoundly impacts the physical structure of the atmosphere and meteorology. Ozone is also an important photolytic source for HO radicals, the driving force for most of the chemistry that occurs in the lower atmosphere, is essential to shielding biota, and is the only molecule in the atmosphere that provides protection from UV radiation in the 250-300 nm region. However, recent concerns regarding environmental issues have inspired a need for a greater understanding of ozone, and the effects that it has on the Earth's atmosphere. The Mechanisms of Reactions Influencing Atmospheric Ozone provides an overview of the chemical processes associated with the formation and loss of ozone in the atmosphere, meeting the need for a greater body of knowledge regarding atmospheric chemistry. Renowned atmospheric researcher Jack Calvert and his coauthors discuss the various chemical and physical properties of the earth's atmosphere, the ways in which ozone is formed and destroyed, and the mechanisms of various ozone chemical reactions in the different spheres of the atmosphere. The volume is rich with valuable knowledge and useful descriptions, and will appeal to environmental scientists and engineers alike. A thorough analysis of the processes related to tropospheric ozone, The Mechanisms of Reactions Influencing Atmospheric Ozone is an essential resource for those hoping to combat the continuing and future environmental problems, particularly issues that require a deeper understanding of atmospheric chemistry.

Chemistry of Ozone in Water and Wastewater Treatment This book focuses on present state of the art chemical oxidation technologies with regard to various wastewater applications. It is a valuable aid to engineers and scientists engaged in developing cost-effective solutions to complex water quality problems in today's regulatory environment.

Laboratory Ozonation of Municipal Wastewaters The ubiquitous presence and chronic effect of pharmaceuticals is one of the emerging issues in environmental field. As a result of incomplete removal by sewage treatment plants, pharmaceuticals are released into the environment and drinking water sources. On the other hand, conventional drinking water treatment processes such as coagulation, filtration and sedimentation are reported to be ineffective at removing pharmaceuticals. Therefore, the potential presence of pharmaceuticals in finished drinking water poses a threat on public health. Antibiotics, as an important group of pharmaceuticals, are given special concerns because the potential development of bacteria-resistance. Ozonation and advanced oxidation processes are demonstrated to be quite effective at removing pharmaceuticals. The oxidation of pharmaceuticals is caused by ozone itself and hydroxyl radicals that are generated from ozone decomposition. Whether ozone or hydroxyl radicals are the primary oxidant depends on the specific pharmaceutical of interest and the background water matrix. In this research, erythromycin, a macrolide antibiotic, was chosen as the target compound because of its high detection frequency in the environment and its regulation status. The objective of this research was to investigate the removal performance of erythromycin by ozonation from the standpoint of kinetics. The effects of pH, carbonate and phosphate buffers, and initial ozone dose on ozonation of erythromycin were also studied. The second-order rate constant for the reaction between deprotonated erythromycin and ozone was determined to be 4.44x109 M−1·s−1 while protonated erythromycin did not react with ozone. Ozone was determined to be the primary oxidant for erythromycin removal by ozonation. pH was found to have great positive impact on the degradation of erythromycin by ozonation due to the deprotonation of erythromycin at high pH. Carbonate and phosphate buffers were found to have negligible effects on the degradation of erythromycin by ozonation. Initial ozone dose showed a positive impact on the total erythromycin removal rate by ozonation.

Ozone in Food Processing

An Ultrasound Catalyzed Ozone Oxidation Process Feasibility Study for the Destruction of TNT and Other Explosives in Aqueous Solution The influence of compounds in the environment on the chemistry of plants is a topic which has economic and scientific implications of global importance. Selected presentations in this symposium covered several topics within this immense field, inclusive of air, soil, and aquatic sources of the compounds. As demonstrated in Chapter 4 by O'Keeffe et al. we have not restricted the discussion solely to negative aspects of anthropogenic compounds. Nor could we begin to cover comprehensively all major classes of environmental compounds in the air, soil or

water that may have an effect on the phytochemistry of plants. Our intent was to focus on some of the timely and well publicized environmental constituents such as ozone, sulfur dioxide, acid rain, and others, to provide an authoritative publication specifically related to environ mental modifications of plant chemistry. The concept of this symposium originated with the Executive Committee of the Phytochemical Society of North America in 1983. It was brought to fruition during July 13-17, 1986 on the campus of the University of Maryland at the annual meeting of the PSNA through the efforts of the Symposium Committee composed of James A. Saunders and Lynn Kosak-Channing. Financial support for this meeting was provided by the Phytochemical Society of North America, as well as by generous contributions from E. I. du Pont de Nemours & Company and the U. S. Department of Agriculture. The Organizing Committee, consisting of J. A. Saunders (Chair), J. M. Gillespie, L. Kosak-Channing, E. H. Lee, J. P.

Environmental Effects of Ozone Depletion This volume offers an overview of the occurrence and distribution of personal care products in continental and marine waters, presents analytical methods and degradation technologies and discusses their impact on human health. Experts from different disciplines highlight major issues for each family of compounds related to their occurrence in the water column as well as in solid and biota samples, methodological strategies for their analysis, non-conventional degradation technologies, (eco)toxicity data and their human and environmental risk assessment. The book also includes a general introduction to personal care products, covering their properties, use, behaviour and regulatory framework, and a final chapter identifying knowledge gaps and future research trends. It will appeal to experts from various fields of research, including analytical and environmental chemistry, toxicology and environmental engineering.

Pesticide Removal by Combined Ozonation and Granular Activated Carbon Filtration

Impact of Ozone Exposure on OPV Efficiency Even though ozone has been applied for a long time for disinfection and oxidation in water treatment, there is lack of critical information related to transformation of organic compounds. This has become more important in recent years, because there is considerable concern about the formation of potentially harmful degradation products as well as oxidation products from the reaction with the matrix components. In recent years, a wealth of information on the products that are formed has accumulated, and substantial progress in understanding mechanistic details of ozone reactions in aqueous solution has been made. Based on the latter, this may allow us to predict the products of as yet not studied systems and assist in evaluating toxic potentials in case certain classes are known to show such effects. Keeping this in mind, Chemistry of Ozone in Water and Wastewater Treatment: From Basic Principles to Applications discusses mechanistic details of ozone reactions as much as they are known to date and applies them to the large body of studies on micropollutant degradation (such as pharmaceuticals and endocrine disruptors) that is already available. Extensively quoting the literature and updating the available compilation of ozone rate constants gives the reader a text at hand on which his research can be based. Moreover, those that are responsible for planning or operation of ozonation steps in drinking water and wastewater treatment plants will find salient information in a compact form that otherwise is quite disperse. A critical compilation of rate constants for the various classes of compounds is given in each chapter, including all the recent publications. This is a very useful source of information for researchers and practitioners who need kinetic information on emerging contaminants. Furthermore, each chapter contains a large selection of examples of reaction mechanisms for the transformation of micropollutants such as pharmaceuticals, pesticides, fuel additives, solvents, taste and odor compounds, cyanotoxins. Authors: Prof. Dr. Clemens von Sonntag, Max-Planck-Institut für Bioanorganische Chemie, Mülheim an der Ruhr, and Instrumentelle Analytische Chemie, Universität Duisburg-Essen, Essen, Germany and Prof. Dr. Urs von Gunten, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, and Ecole Polytechnique Federal de Lausanne, Lausanne, Switzerland.

Ozonation of Erythromycin and the Effects of PH, Carbonate and Phosphate Buffers, and Initial Ozone Dose

Evolution of Acidic Functional Groups on Biochars by Ozone Oxidation to Improve Performance as a Soil Amendment

Chemical Oxidation Current Developments in Biotechnology and Bioengineering: Emerging Organic Micropollutants summarizes the current

knowledge of emerging organic micropollutants in wastewater and the possibilities of their removal/elimination. This book attempts a thorough and exhaustive discussion on ongoing research and future perspectives on advanced treatment methods and future directions to maintain and protect the environment through microbiological, nanotechnological, application of membrane technology, molecular biological and by policymaking means. In addition, the book includes the latest developments in biotechnology and bioengineering pertaining to various aspects in the field of emerging organic micropollutants, including their sources, health effects and environmental impacts. Includes testing methods for the analysis and characterization of emerging organic micropollutants in wastewater Discusses the environmental impact and health hazards of emerging organic micropollutants in wastewater Provides a useful guide to identify priority areas of research demand in the remediation/removal of emerging organic micropollutants

Current Developments in Biotechnology and Bioengineering Pinkwater containing TNT/RDX in the ratio 70%/30% was treated with ozone in the presence of ultrasound. Effects of the variables, initial solution pH, ultrasound power level and frequency, solution concentration and reaction temperature were studied. Reaction temperature and pH were the most important parameters with 99% TNT destruction achieved within one hour of ozonation at 59 degrees C and an initial solution pH of 10.0. (Author).

Environmental Health Perspectives In response to many U.S. water utilities that are considering changing disinfectants from chlorine to alternative disinfectants, this research has been undertaken to gain knowledge of long-term effects.

International Symposium on the Biomedical Effects of Ozone and Related Photochemical Oxidants "This book focuses on the use of Ozone to manage dental caries and discusses the indications for the clinical applications necessary to achieve an environment that will ensure 'health'." -book cover.

Tropospheric Ozone

Personal Care Products in the Aquatic Environment With the advent of the Safe Drinking Water Act Amendments of 1986, many water utilities are reexamining their water treatment practices. Upcoming new regulations on disinfection and on disinfection by-products, in particular, are the primary driving forces for the big interest in ozone. It appears that ozone, with its strong disinfection capabilities, and apparently lower levels of disinfection by-products (compared to other disinfectants), may be the oxidant/disinfectant of choice. Many utilities currently using chlorine for oxidation may need to switch due to chlorine by-product concerns. Utilities using chloramines may need to use ozone to meet CT requirements. This book, prepared by 35 international experts, includes current technology on the design, operation, and control of the ozone process within a drinking water plant. It combines almost 100 years of European ozone design and operating experience with North American design/operations experience and the North American regulatory and utility operational environment. Topics covered include ozone chemistry, toxicology, design consideration, engineering aspects, design of retrofit systems, and the operation and economics of ozone technology. The book contains a "how to" section on ozone treatability studies, which explains what information can be learned using treatability studies, at what scale (bench, pilot, or demonstration plant), and how this information can be used to design full-scale systems. It also includes valuable tips regarding important operating practices, as well as guidance on retrofits and the unique issues involved with retrofitting the ozone process. With ozone being one of the hottest areas of interest in drinking water, this book will prove essential to all water utilities, design engineers, regulators, and plant managers and supervisors.

Advances in Wastewater Treatment II This book discusses the methods synthesizing various carbon materials, like graphite, carbon blacks, carbon fibers, carbon nanotubes, and graphene. It also details different functionalization and modification processes used to improve the properties of these materials and composites. From a geometrical–structural point of view, it examines different properties of the composites, such as mechanical, electrical, dielectric, thermal, rheological, morphological, spectroscopic, electronic, optical, and toxic, and describes the effects of carbon types and their geometrical structure on the properties and applications of composites.

In Vitro Effects of Ozone on Enveloped Animal Virus Ozone is a normal constituent of air but this gas becomes dangerous for living

organism when its concentration in the troposphere is too high. Most previous studies of this substance examined it merely in its role as an earth screen for the biosphere or an air pollutant. This book will also view its derivatives (active oxygen species) at a molecular and cellular level, as substances that have both positive and negative effects on plant life. Plant cells will be considered as both recipients and sources of ozone, as well as possible biosensors and bioindicators for low and high concentrations of the compound.

The Effects of Ozonation Pathways on the Formation of Ketoacids and Assimilable Organic Carbon (AOC) in Drinking Water

Measuring Oxidants and Oxidative Stress in Biological Systems

Tropospheric Ozone It is well known that the ozone layer protects the Earth and its life from the harmful ultraviolet (UV) radiation of the sun. It has also been discovered that this layer was being depleted to the extent that holes were appearing in it by several substances (such as CFCs) which have since been banned. Despite this action recent studies have shown that the ozone layer is still being depleted at a rapid rate and that holes are now beginning to appear over areas which are quite densely populated. Atmospheric Ozone Variability examines the potential problems that depletion of ozone causes in relation to climate change, human health and the ecosystem. It also examines the ways in which ozone is formed and depleted as being fundamental to the debate.

Atmospheric Ozone Variability This book is the first to bring together essential information onthe application of ozone in food processing, providing an insightinto the current state-of-the-art and reviewing established andemerging applications in food processing, preservation and wastemanagement. The chemical and physical properties of ozone are described,along with its microbial inactivation mechanisms. The variousmethods of ozone production are compared, including their economicand technical aspects. Several chapters are dedicated to the majorfood processing applications: fruit and vegetables, grains, meat,seafood and food hydrocolloids, and the effects on nutritional andquality parameters will be reviewed throughout. Further chaptersexamine the role of ozone in water treatment, in food wastetreatment and in deactivating pesticide residues. The internationalregulatory and legislative picture is addressed, as are the healthand safety implications of ozone processing and possible futuretrends.

Scientific and Technical Aerospace Reports The main objective of the workshop was to increase our knowledge of ozone formation and distribution in the troposphere, its relation to precursor (NO~ and HC species) distribution, how it is affected by transport processes in the troposphere, and to show how the increasing levels of ozone can cause environmental problem. The focus was on the interaction of ozone on regional and global scales. There is mounting evidence that such interactions occur and that the ozone levels are increasing in most of the Northern Hemisphere tropo sphere. A likely source of ozone increase is human activity. As result of this, tropospheric climate may change significantly within a few decades, either through direct effects by ozone itself or indirectly through its effect on other radiatively active trace species. Further more, ozone may have adverse effects on vegetation over large continental areas due to enhanced levels which have been measured to take place. As it is well known that ozone plays a key role in the oxidation of a large number of chemical species in the troposphere, natural as well as man-made, the atmospheric distribution of important trace species like sulfur dioxide, nitrogen oxides and hydrocarbons could be markedly changed as a result of ozone changes. The rapidly increasing interest in tropospheric ozone, and the key role ozone plays in several atmospheric areas as well the obvious increase in the tropospheric concentration of ozone made ozone a natural choice as a topic for the workshop.

Ozone in Nature and Practice The book reviews advanced methods of wastewater treatments. Included are oxidation processes for the degradation of organic molecules; applications of nanomaterials and nanocomposites in membrane-based processes; design of adsorption columns; photocatalytic degradation processes; and the removal of dyes, pesticides and pharmaceutical compounds. Keywords: Degradation of Organic Molecules, Nano Filtration, Ultrafiltration, Microfiltration, Nanomaterial-based Membranes, Adsorption Columns, Nano Carbon Cage, Photocatalytic Degradation, Dyes, Pesticides, Pharmaceutical Compounds, Advanced Oxidation Processes, Complex Organic Molecules, Perfluorooctanoic Acid, Hydrolytic Acidification, Levofloxacin Degradation, Catalytic Degradation, Energy Storage.

Evaluation of an Air Stripping-Ozone Contactor System

Selected Water Resources Abstracts

Ozone and Plant Cell

Phytochemical Effects of Environmental Compounds

Chemistry of Ozone in Water and Wastewater Treatment

Ozone Organic solar cells are a considerable promise for alternate energy sources owing to their plentiful, easily accessible and renewable source of power. Degradation on organic film and anode layer are the major factors that determine device reliability and ozone can induce damage to these materials due to its strong oxidizing property. This study measured the sustainability of a type of organic photovoltaic (OPV) film (P3HT:PC71BM) and its anodes (Al and MoO3) to different levels of ozone environment and investigated the impact of ozone exposure on OPV film and anodes efficiency. The devices were fabricated in a Glove Box under controlled N2 atmosphere using Spin Coating and Physical Vapor Deposition and exposed to varied ozone concentrations, followed by J-V measurements to determine the Power Conversion Efficiency and Fill Factor. The effects of ozone exposure on the films were compared vs. the effects of exposure on complete devices with anodes (Al and MoO3). The results show that the devices decay from normal efficiency (4%) to 0% in 12 hours under 300 ppb (10%) ozone concentration and decay to 0% in 6 hours when the ozone concentration was 600 ppb (10%), when only the polymer thin films are exposed. This established an inverse linear relationship between the decay rate and ozone exposure at high concentrations on the OPV films. Furthermore, the effect of exposure to ambient ozone concentration on the polymer films, which is 70 ppb (15%), was also investigated and the devices were found to decay to 0% in 28 hours, which is much faster than expected. The decay resistance of complete devices when the polymer films are coated with thermally evaporated anodes (Al and MoO3) before exposure to 400 ppb ozone concentration was investigated. The average efficiency of the complete device after 2, 6, 10, 15, 28 and 42 hours exposure in 400 ppb ozone environment was 4.16% with a standard deviation of 0.12%. The test findings for the complete device with coated anodes show that the current design of the complete OPV device has good resistance to ozone oxidation without additional protection or encapsulation. This finding has significant bearing with respect to the selection and price of encapsulation material requirements for OPV. This research work is a part of a project funded by the National Science Foundation (Grant # CHE - 1230598) on the SEP Collaborative: Development of economically viable, highly efficient organic photovoltaic solar cells.

Kinetic Isotope Effects in the Oxidation of Silanes by Mercuric Acetate, Thallium Triacetate, and Ozone This book describes the methods of analysis and determination of oxidants and oxidative stress in biological systems. Reviews and protocols on select methods of analysis of ROS, RNS, oxygen, redox status, and oxidative stress in biological systems are described in detail. It is an essential resource for both novices and experts in the field of oxidant and oxidative stress biology.

The effects of ozone on mammalian cell cultures and viruses in vitro This research aimed to identify and understand mechanisms thar underlie the beneficial effect of ozonation on removal of pesticides and other micropollutants by Granular Activated Carbon (GAC) filtration. This allows optimization of the combination of these two processes, termed Biological Activated Carbon filtration. The study concluded that ozonation significantly improves removal of atrazine by GAC filtration not only due to the wellknown effect of oxidation of atrazine, but also due to the effect of partical oxidation of Background Organic Matter (BOM) present in water. Ozone-induced oxidation of BOM was found to improve adsorption of atrazine in GAC filters. Biodegradation of atrazine in these filters wasnot demonstrated. Higher GAC's adsorption capacity for atrazine and faster atrazine's mass transfer in filters with ozonated rather than non-ozonated influent were explained as due to ozonated BOM. Both can be attributed to enhanced biodegradability and reduced adsorbsbility of partially ozidated BOM compounds, resulting in their increased biodegradation and decreased adsorption in GAC filters.

The Mechanisms of Reactions Influencing Atmospheric Ozone

Ozone in Water Treatment