Removal Of Dissolved Oxygen From Water A Comparison Of Four

The Handbook of Membrane Separations: Chemical, Pharmaceutical, and Biotechnological Applications provides detailed information on membrane separation technologies as they have evolved over the past decades. To provide a basic understanding of membrane technology, this book documents the developments dealing with these technologies. It explores chemical, pharmaceutical, food processing and biotechnological applications of membrane processes ranging from selective separation to solvent and material recovery. This text also presents in-depth knowledge of membrane separation mechanisms, transport models, membrane permeability computations, membrane types and modules, as well as membrane reactors.

This presentation describes various aspects of the regulation of tissue oxygenation, including the roles of the circulatory system, respiratory system, and blood, the carrier of oxygen within these components of the cardiorespiratory system. The respiratory system takes oxygen from the atmosphere and transports it by diffusion from the air in the alveoli to the blood flowing through the pulmonary capillaries. The cardiovascular system then moves the oxygenated blood from the heart to the microcirculation of the various organs by convection, where oxygen is released from hemoglobin in the red blood cells and moves to the parenchymal cells of each tissue by diffusion. Oxygen that has diffused into cells is then utilized in the mitochondria to produce adenosine triphosphate (ATP), the energy currency of all cells. The mitochondria are able to produce ATP until the oxygen tension or PO2 on the cell surface falls to a critical level of about 4–5 mm Hg. Thus, in order to meet the energetic needs of cells, it is important to maintain a continuous supply of oxygen to the mitochondria at or above the critical PO2 . In order to accomplish this desired outcome, the cardiorespiratory system, including the blood, must be capable of regulation to ensure survival of all tissues under a wide range of circumstances. The purpose of this presentation is to provide basic information about the operation and regulation of the cardiovascular and respiratory systems, as well as the properties of the blood and parenchymal cells, so that a fundamental understanding of the regulation of tissue oxygenation is achieved.

Applied Mechanics and Civil Engineering VI includes the contributions to the 6th International Conference on Applied Mechanics and Civil Engineering (AMCE 2016, Hong kong, China, 30-31 December 2016), and showcases the challenging developments in the areas of applied mechanics, civil engineering and associated engineering practice. The book covers a wide variety of topics: - Applied mechanics and its applications in civil engineering; - Bridge engineering; - Underground engineering; - Structural safety and reliability; - Reinforced concrete (RC) structures; - Rock mechanics and rock engineering; - Geotechnical in-situ testing & monitoring; - New construction materials and applications; -

Computational mechanics; - Natural hazards and risk, and - Water and hydraulic engineering. Applied Mechanics and Civil Engineering VI will appeal to professionals and academics involved in the above mentioned areas, and it is expected that the book will stimulate new ideas, methods and applications in ongoing civil engineering advances.

This volume gives an overview of the wide spectrum of nitrogen removal processes available today. Part A gives a brief outline of nitrogen pollution sources, the global nitrogen cycle and the treatment methods; part B presents details of all biological methods for nitrogen removal; and part C describes the physico-chemical nitrogen removal methods. Design examples relating to parts B and C are given in appendices. Design equations are given in the text, but more emphasis has been placed on the profound understanding of the biological and chemical processes and the basic factors that influence these. Parameters and regression equations for a quantitive description of these factors and their influence on the key processes are presented in several tables. This feature makes the volume a very useful handbook; it will be of great value to those environmentalists who require a record of the available nitrogen removal methods from both biological and chemical viewpoints.

Abstract: The potential changes of dissolved oxygen concentrations caused by combined sewer overflows (CSOs) are an important consideration before and after dam removal in many urban rivers. In central Ohio, removal of a 2-m-high dam is planned in Columbus for the fourth-order Lower Olentangy River, which has several major CSOs. Two simulation models were developed, using STELLA® 9.1.4, an icon-based dynamic systems modeling software, to investigate the interactions of hydrology, water quality, CSOs, and dam removal on the Olentangy River reservoir before the Fifth Avenue Dam. The first simulation model, focusing on daily dissolved oxygen (DO), was created to predict DO changes with the pollution of CSOs before and 120 hours after dam removal. Field DO data in 2009, 2011, and 2012 were used to calibrate and validate the model. The second simulation model, a weekly water quality model, was created to simulate one-year streamflow, gross primary productivity (GPP) and DO changes before dam removal and to predict long-term water quality changes 2 years after dam removal. Field streamflow and water quality data in 2004 and 2009 were used to calibrate the model. The results from both field data analysis and model simulations suggest that large differences existed in water quality between base flow and flooding periods. The water quality of the Lower Olentangy River will be impacted immediately after dam removal. DO concentrations will continue to be significantly impacted by CSO discharges even after dam removal.

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DENITRIFICATION - Chapter 7 Denitrification: The Basics - Chapter 8 Denitrifying Bacteria - Chapter 9 Denitrification and Limiting Factors - PART THREE: BIOLOGICAL PHOSPHORUS REMOVAL - Chapter 10 Biological Phosphorus Removal: The Basics - Chapter 11 EBPR: Process Control - Abbreviations and Acronyms - Glossary - Bibliography - Biological nutrient removal (BNR), the removal of nitrogen and phosphorus from wastewater, is a complex process. Although the activated sludge process is an efficient technology for the removal of biochemical oxygen demand (BOD) and total suspended solids (TSS), it provides less-than-optimal conditions for the removal of nitrogen and phosphorus, and presents numerous challenges to the operator trying to satisfy the many requirements for several different groups of bacteria. In addition to satisfying the requirements there are numerous, highly variable operational conditions that impact BNR. These conditions include: changes in strength and composition of the wastewater, alkalinity and pH, temperature, and presence of inhibitory and toxic wastes. Even fluctuations in flows, especially from inflow and infiltration, can adversely impact the aerobic, anoxic, and anaerobic conditions needed for successful BNR. Of the three treatment processes, nitrification, denitrification, and enhanced biological removal, nitrification is often the most difficult to achieve. Therefore, a large portion of this book reviews nitrification. Operators of the activated sludge process need to understand the basic biological, chemical, and physical requirements for BNR in order to improve the performance of these treatment processes. An Operator's Guide to Biological Nutrient Removal (BNR) in the Activated Sludge Process is intended to help operators in the monitoring, troubleshooting, and process control of BNR. Numerous tables and figures are included in the book to help the operator understand the biological and chemical reactions that are involved in BNR processes and how the reactions can be monitored for process control. Design of BNR processes is not addressed in this book. Design is addressed in numerous engineering publications. The book serves to help operators achieve permit compliance for nitrogen and phosphorus discharge limits and obtain cost-effective operation. -

Thermal power plants are one of the most important process industries for engineering professionals. Over the past decades, the power sector is facing a number of critical issues; however, the most fundamental challenge is meeting the growing power demand in sustainable and efficient ways. Practicing power plant engineers not only look after operation and maintenance of the plant, but, also look after range of activities including research and development, starting from power generation to environmental aspects of power plants. The book Thermal Power Plants - Advanced Applications introduces analysis of plant performance, energy efficiency, combustion, heat transfer, renewable power generation, catalytic reduction of dissolved oxygen and environmental aspects of combustion residues. This book addresses issues related to both coal fired and steam power plants. The book is suitable for both undergraduate and research

higher degree students, and of course for practicing power plant engineers. Keywords: ORP, Dissolved Oxygen, and pH, nitrogen removal, Nitrogen species profiles, intermittent aeration, swine wastewater.

In order to prevent waterside corrosion of steam generating plants used by the Navy, it is necessary to remove the dissolved oxygen from the water. In most cases this is accomplished by mechanical deaeration. When the efficiency of the deaerator is reduced, however, or when oxygen (air) leaks occur, it is necessary to supplement the oxygen-removal process with chemical treatment. Small amounts of oxygen can be scavenged economically by adding a reducing agent, such as sodium sulfite, to the feedwater. The objective of the study was to increase the effectiveness of the use of sulfite as an oxygen scavenger in closed water systems. The chelating agent chosen was disodium ethylenediamine tetraacetate (Na2EDTA). Other inhibitors were also included in some of the experiments. The autoxidation of sodium sulfite was inhibited by the EDTA. Results of experiments show that, when ions of copper and iron are chelated with EDTA, they no longer catalyze the oxidation of Na2SO3.

The reaction rate of sodium sulfite was studied as a function of oxygen concentration, Na2SO3/O2 ratio, temperature, catalyst, pH and surface/volume ratio. The reaction rate of hydrazine with dissolved oxygen was also studied. Oxygen removal is incomplete when the sulfite to oxygen ratio is leas than the stoichiometric quantity. With the stoichiometric quantities of oxygen and sodium sulfite present, removal is incomplete at 100 deg F in 1 min, at 200 deg F, about 95% of the oxygen is removed in 10 sec and at 300 deg F oxygen removal is essentially complete in 10 sec. With an excess of sulfite present (10 Na2SO3/1 O2, molar), 95% of the oxygen is removed at 100 deg F in 10 sec. At 200 and 300 deg F, oxygen removal is essentially complete in 10 sec. The rate of oxygen removal is dependent to some extent on the container material. The sulfite oxygen reaction progresses at a higher rate in boiler water than in feedwater. The reaction rate of hydrazine with oxygen is low compared with the reaction rate of sulfite and dissolved oxygen. No reduction of oxygen was noted over a one-minute period with an excess of hydrazine. (auth).

Dissolved oxygen was extracted from flowing sodium by ionic transport through an impervious solid electrolyte wall. Current efficiency and cell resistivity were measured for three solid oxide electrolytes at several temperatures and voltages. Best results were obtained with ZrO2 + 8 m/o CaO at 1200F and 4 to 6 volts/mm. Current efficiency was low, due to induced electronic conduction, but oxygen removal rates higher than in zirconium hot traps were achieved. Similar cells tested in pure oxygen at the same temperature also developed electronic conduction, suggesting that it is due more to low temperature electrolysis than to the low oxygen pressure in sodium. Application of such cells to aerospace sodium systems is hindered by the unpredictable life of the ceramic tube. A modified cell concept, substituting an oxide film on a metallic substrate for the free-standing ceramic tube, is described. (Author).

A program to investigate the effect of storage time and temperature on changes in thermal stability quality as measured by the CRC-Modified Fuel Coker (Supersonic Fuel or SSF) for five widely different fuel types revealed no significant deterioration of any fuels after 36 weeks at ambient field condition or 22 weeks at 130F. After storage up to 36 days at 180F four fuels showed no loss in thermal stability, but an HF alkylate fuel, containing about 2 per cent olefins, showed a significant loss after only 6 days at 180F. Removal of dissolved oxygen (to less than one part per million) from the HF alkylate fuel prior to storage prevented deterioration. Phillips' small scale (5-ml Bomb) procedure, developed to measure changes in fuel thermal stability quality, was found to correlate satisfactorily with the ASTM-CRC (Standard) Fuel Coker for ASTM Type-A distillate fuels. The amount of dissolved oxygen in fuels has been found to affect, significantly, thermal stability quality as measured by the 5-ml Bomb and the Fuel Cokers. Removal of dissolved oxygen from fuels of low and average thermal stability invariably

resulted in gross improvements. Only slight improvements were found after removing dissolved oxygen from fuels of very high thermal stability quality.

Over the years the aim of the International Conference on Magnet Technology has been the exchange of information on the design, construction and operation of magnets for a variety of applications, such as high energy physics, fusion, electrical machinery and others. The aim has included advances in materials for magnet conductors, insulators and supporting structures. Since its inception the focus of the International Conference on Magnet Technology has gradually shifted to superconducting magnets. Now almost all papers are related to superconductivity. The 11th International Conference on Magnet Technology (MT-11) was organized by the combined efforts of the Institute of Electrical Engineers of Japan, the Association for Promotion of Electrical, Electronic and Information Engineering, and the Tokyo Section of the IEEE. The Conference was held at the Tsukuba University Hall, Tsukuba, Japan, from 28 August to 1 September 1989, courtesy ofthe University ofTsukuba. The Tsukuba University Hall was large enough to host invited talks, parallel sessions, poster sessions and industrial exhibitions. 461 participants from 19 countries registered for MT-ll, and 280 invited and contributed papers were presented. The papers were reviewed not only by the Program Committee but also by foreign participants. Working sessions and social events were characterized by a truly international atmo sphere. Scientific as well as cultural excursions were organized so that foreign visitors could experience the spirit of modern Japan. 26 companies, of which 8 were from Western countries, participated in the industrial exhibition which featured diverse products and services of interest to the magnet community.

Covering the essential aspects of the corrosion behavior of metals in aqueous environments, this book is designed with the flexibility needed for use in courses for upper-level undergraduate and graduate students, for concentrated courses in industry, for individual study, and as a reference book.

Traditional methods of cultivation of micro-organisms provide little control over the ever-changing physical and chemical environments to which growing populations are exposed. The need for a variety of highly standardized conditions of growth and the selection of several new parameters to measure growth or cultural progress has been recognized. This volume describes the measurement and control of the physical and chemical factors that affect or indicate microbial activities, usually in homogeneous liquid culture. An introduction to the general principles of chemical and physical measurements and to the automatic recording and control of them is presented. Some chapters focus on the theoretical and practical aspects of techniques of continuous cultivation in the laboratory with indications of its application to research problems.

The Antiproton (Pbar) Source at Fermi National Accelerator Laboratory is a facility comprised of a target station, two rings called the Debuncher and Accumulator and the transport lines between those rings and the remainder of the particle accelerator complex. Water is by far the most common medium for carrying excess heat away from components, primarily electromagnets, in this facility. The largest of the water systems found in Pbar is the 95 degree Fahrenheit Low Conductivity Water (LCW) system. LCW is water which has had free ions removed, increasing its resistance to electrical current. This water circuit is used to cool magnets, power supplies, and stochastic cooling components and typically has a resistivity of 11--18 megaohms-cm. For more than ten

years the Antiproton rings were plagued with overheating magnets due to plugged water-cooling channels. Various repairs have been tried over the years with no permanent success. Throughout all of this time, water samples have indicated copper oxide, CuO, as the source of the contamination. Matters came to a head in early 1997 following a major underground LCW leak between the Central Utilities Building and the Antiproton Rings enclosures. Over a span of several weeks following system turn-on, some twenty magnets overheated leading to unreliable Pbar source operation. Although it was known that oxygen in the system reacts with the copper tubing to form CuO, work to remedy this problem was not undertaken until this time period. Leaks, large quantities of make-up water, infrequent filter replacement, and thermal cycling also result in an increase in the corrosion product release rate. A three-pronged approach has been implemented to minimize the amount of copper oxide available to plug the magnets: (1) installation of an oxygen removal system capable of achieving dissolved oxygen concentrations in the parts per billion (ppb) range; (2) regular closed-loop filter/flushing of the copper headers and magnets and stainless steel header during down periods; and (3) installation of a full-flow filtration system designed to remove any CuO produced by the trace amounts of dissolved oxygen in the LCW system. All three items have been completed. The dissolved oxygen concentration is now routinely on the order of 15 ppb and returns to that level within 8--12 hours following an upset condition such as a leak. Prior to installation of the oxygen removal system, oxygen levels were approximately 3,000 ppb. Particle analysis of the water before-and-after filter and flushing of the LCW system indicates a cleaner system. Another round of filter/flushing occurred shortly before the scheduled start-up and will be performed during down periods when deemed necessary by newly-installed instrumentation. The full-flow filtration system has been recently commissioned. The system consists of two parallel filter housings, with a rated total flow capacity of 2,500 gpm at 300 psi, piping to the LCW supply header and associated instrumentation.