

地学新书资源推介

（“碳中和”最新图书专辑）

2021 年第 5 期

中国地质调查局地学文献中心

编辑说明

1、《地学新书资源推介》立足“围绕国家重大需求和地质调查中心工作，充分发挥地学文献服务支撑作用”的目标任务，瞄准地调局业务布局中的科技需求，调研国内外地学文献资源动态，努力采集最新最全的国内外地学文献资源，为广大的地质工作者和科研人员提供文献资源资讯。

2、本推介为“地学文献信息更新与服务”二级项目成果之一，每年根据需求不定期发布。

3、本期为“碳中和”系列文献目录，内容包含应对气候变化的全球解决方案和数值模拟研究，碳捕获、碳储存和利用的技术方法、研究成果、以及工业应用等。

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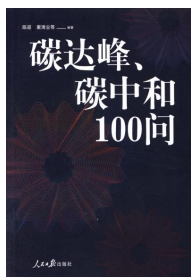
文献资源室

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一、中文图书

碳达峰、碳中和 100 问



责任者: 陈迎, 巢清尘等编著

出版者: 人民日报出版社

ISBN: 978-7-5115-6953-0

出版年: 2021

页码: 1 pdf.

索书号: Oa2466

获取途径: 馆藏纸质图书, 馆藏非书资料数据库

摘要: 2020 年 9 月, 中国宣布二氧化碳排放力争于 2030 年前达到峰值, 努力争取 2060 年前实现碳中和的目标后, 全球应对气候变化的热情被重新点燃, 中国成为全球低碳实践的创新者、引领者。“碳达峰、碳中和”成为媒体的热词和全社会关注的焦点。编写组成员在多个场合参加活动时发现不同知识背景的人对概念的科学内涵、政策含义、实现路径均存在不同的理解。

本书给读者提供较为系统的“碳达峰碳中和”知识: 介绍了“碳达峰、碳中和”对我国全面建设社会主义现代化强国的重要意义, “碳达峰、碳中和目标”的背景和科学基础, 实现碳达峰、碳中和目标的政策行动, 强调需要社会经济全面转型, 探讨各领域各部门如何转型, 这种转型将面临怎样的挑战和机遇, 并号召全社会共同努力, 强调每个人都可以为实现碳达峰、碳中和目标贡献力量。

气候经济与人类未来 : 比尔·盖茨给世界的解决方案 = How to avoid a climate disaster : the solutions we have and the breakthroughs we need



责任者: (美)比尔·盖茨(Bill Gates)著, 陈召强译

出版者: 中信出版集团股份有限公司

ISBN: 978-7-5217-2833-0

出版年: 2021

页码: 1 pdf.

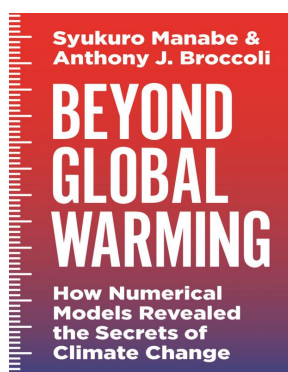
索书号: Oa2467

获取途径: 馆藏纸质图书, 馆藏非书资料数据库

摘要: 本书主要内容讲的是比尔·盖茨从电力、制造业、农业、交通等碳排放主要领域分析了零排放面临的挑战, 可使用的技术工具以及我们需要的技术突破, 并提供了一套涵盖广泛但每一步都切实可行的行动计划。

二、西文图书

Beyond gobal warming : how numerical models revealed the secrets of climate change / 超越全球变暖：数值模型如何揭示气候变化的秘密



责任者: Syukuro Manabe and Anthony J. Broccoli

出版者: Princeton University Press

ISBN: 978-0-691-05886-3, 978-0-691-18516-3 (e-book)

出版年: 2020

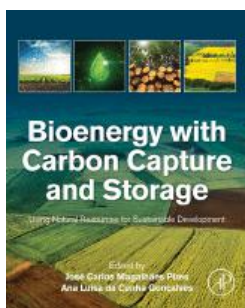
页码: 1 pdf.

索书号: Oa2451

获取途径: 馆藏非书资料数据库

摘要: The primary title of this book, Beyond Global Warming, reflects our strong belief that the greatest value of climate models is not just their utility for making predictions, but also their ability to provide a deeper understanding of how the climate system works. Starting from the pioneering study conducted by Arrhenius more than 100 years ago, this book presents a history of the use of models in studies of climate change. Based upon the analysis of many numerical experiments performed with a hierarchy of climate models of increasing complexity, we seek to elucidate the basic physical processes that control not only global warming but also the changes in climate of the geologic past. It is not our intention, however, to present a comprehensive survey of the literature on climate dynamics and climate change. Instead, we would like to focus on studies in which Manabe was a participant and those that influenced his thinking. We hope to describe the scientific journey that allowed him to develop a better understanding of the processes that underlie climate change. He was accompanied for parts of this journey by Broccoli, who was like wise influenced and informed by the studies described in this volume.

Bioenergy with carbon capture and storage : using natural resources for sustainable development / 碳捕获和储存的生物能源：利用自然资源实现可持续发展



责任者: edited by : Jose Carlos Magalhaes Pires ; Ana Luisa Da Cunha Goncalves.

出版者: Academic Pressis [an imprint of Elsevier]

ISBN: 978-0-12-816229-3

出版年: 2019

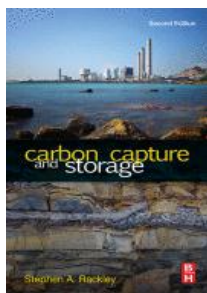
页码: 1 pdf.

索书号: Oa2454

获取途径: 馆藏非书资料数据库

摘要: Bioenergy with Carbon Capture and Storage: Using Natural Resources for Sustainable Development presents the technologies associated with bioenergy and CCS and its applicability as an emissions reduction tool. The book explores existing climate policies and current carbon capture and storage technologies. Sections offer an overview of several routes to use biomass and produce bioenergy through processes with low or even negative CO₂ emissions. Associated technology and the results of recent research studies to improve the sustainability of the processes are described, pointing out future trends and needs. This book can be used by bioenergy engineering researchers in industry and academia and by professionals and researchers in carbon capture and storage.

Carbon capture and storage / 碳捕获和储存(原版)



责任者: Stephen A. Rackley.

出版者: Butterworth-Heinemann [an imprint of Elsevier]

ISBN: 978-1-85617-636-1

出版年: 2010

页码: 1 pdf.

索书号: Oa2458

获取途径: 馆藏非书资料数据库

摘要: Carbon dioxide capture and storage (CCS) is a technology aimed at reducing greenhouse gas emissions from burning fossil fuels during industrial and energy-related processes. CCS involves the capture, transport and long-term storage of carbon dioxide, usually in geological reservoirs deep underground that would otherwise be released to the atmosphere. Carbon dioxide capture and storage offers important possibilities for making further use of fossil fuels more compatible with climate change mitigation policies. The largest volumes of CO₂ could be captured from large point sources such as from power generation, which alone accounts for about 40 per cent of total anthropogenic CO₂ emissions. The development of capture technologies in the power generation sector could be particularly important in view of the projected increase in demand for electricity in fast developing countries with enormous coal reserves (IEA 2002a). Although, this prospect is promising, more research is needed to overcome several hurdles such as important costs of capture technology and the match of large capture sources with adequate geological storage sites. The book will provide a comprehensive, detailed but non-specialist overview of the wide range of technologies involved in carbon dioxide capture and sequestration.

作者简介：Stephen A. Rackley holds a Doctorate in Experimental Physics at the Cavendish Laboratory, University of Cambridge. He has worked for 26 years in the energy industry, with experience in some of the main technologies that are key to the currently most mature CO₂ storage option - identification, assessment, monitoring and verification of sub-surface storage in the geo-sphere. More recently, his focus is on bringing significant new and evolving technologies to an advanced level (but non-specialist) student, engineering and project management audience.

Carbon capture and storage / 碳捕获和储存 (2 版)

责任者: Stephen A. Rackley.

出版者: Butterworth-Heinemann [an imprint of Elsevier]

ISBN: 978-0-12-812041-5

出版年: 2017

页码: 1 pdf.

索书号: Oa2457

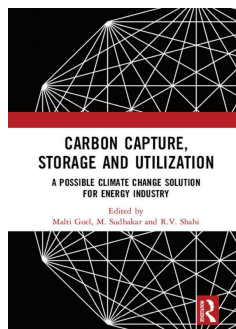
获取途径: 馆藏非书资料数据库

摘要：Carbon Capture and Storage, Second Edition, provides a thorough, non-specialist introduction to technologies aimed at reducing greenhouse gas emissions from burning fossil fuels during power generation and other energy-intensive industrial processes, such as steelmaking. Extensively revised and updated, this second edition provides detailed coverage of key carbon dioxide capture methods along with an examination of the most promising techniques for carbon storage.

The book opens with an introductory section that provides background regarding the need to reduce greenhouse gas emissions, an overview of carbon capture and storage (CCS) technologies, and a primer in the fundamentals of power generation. The next chapters focus on key carbon capture technologies, including absorption, adsorption, and membrane-based systems, addressing their applications in both the power and non-power sectors.

New for the second edition, a dedicated section on geological storage of carbon dioxide follows, with chapters addressing the relevant features, events, and processes (FEP) associated with this scenario. Non-geological storage methods such as ocean storage and storage in terrestrial ecosystems are the subject of the final group of chapters. A chapter on carbon dioxide transportation is also included.

Carbon capture, storage and utilization : a possible climate change solution for energy industry / 碳捕获、储存和利用：能源工业应对气候变化的可能方案



责任者: edited by Malti Geol, M. Sudhakar and R. V. Shahi ; The Energy and Resource Institute.

出版者: CRC Press, Taylor & Francis Group

ISBN: 9780367179083 (hardback)

出版年: 2018

页码: 1 pdf.

索书号: Oa2463

获取途径: 馆藏非书资料数据库

摘要: Carbon Capture and Storage (CCS) has emerged as one among the three key energy technology options to mitigate climate change. The other two are: energy efficiency improvement and increasing use of renewable energy sources.

Introduced in 1990s, the CCS technology is seen as an option to address problems of climate change, and has also added a new dimension to scientific research in addressing one of the most contentious issues of the 21st century. The other two technology options are already being pursued in a mission mode under National Action Plan on Climate Change. CCS being a late entrant to the scene, has attracted the attention of both researchers and policy makers.

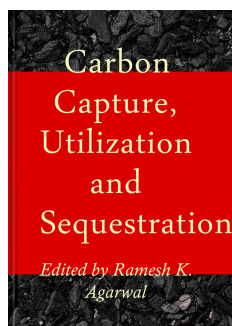
The book discusses potential of an innovative energy technology CCSU towards a sustainable energy future. Various techniques of CO₂ recovery from power plants by physical, chemical, and biological means as well as challenges and prospects in biomimetic carbon sequestration are addressed in this book. It showcases Indian research perspectives to the world and that makes it a significant contribution. It is sincerely hoped that this book will be a valuable guide for policy makers and serve as a reference book also.

This book is an outcome of the workshop on “Carbon Capture and Storage: Earth Processes”. Held from 15 to 19 January 2013, it was supported by Ministry of Earth Sciences, Government of India and organized by Climate Change Research Institute. The aim of this edited book is to analyse how current research on carbon capture, storage and utilization (CCSU) is being pursued in the world and in India, and what possible implications it may have in finding solutions to pollution problems from the energy sector.

In it India's policy development studies and CO₂ capture/fixation research in developing new pathways are described. Technologies for CO₂ bio-sequestration and utilization, EOR from oil wells, and EGR from coal mines are discussed as possible climate change solutions for the coal-based energy industry. An overview of research

frontiers as well as future policy perspectives is presented.

Carbon capture, utilization and sequestration / 碳捕获、利用和封存



责任者: edited by Ramesh K. Agarwal

出版者: [The Author(s). Licensee IntechOpen]

ISBN: 978-1-78923-764-1, 978-1-78923-765-8, 978-1-83881-716-9 (ebook)

出版年: 2018

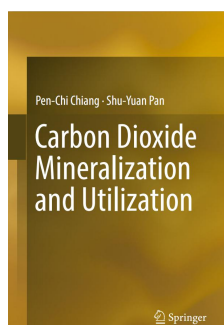
页码: 1 pdf.

索书号: Oa2461

获取途径: 馆藏非书资料数据库

摘要: This book is divided in two sections. Several chapters in the first section provide a state-of-the-art reviews of various carbon sinks for CO₂ sequestration such as soil and oceans. Other chapters discuss the carbon sequestration achieved by storage in kerogen nanopores, CO₂ miscible flooding and generation of energy efficient solvents for postcombustion CO₂ capture. The chapters in the second section focus on monitoring and tracking of CO₂ migration in various types of storage sites, as well as important physical parameters relevant to sequestration. Both researchers and students should find the material useful in their work.

Carbon Dioxide mineralization and utilization / 二氧化碳矿化与利用



责任者: by Pen-Chi Chiang, Shu-Yuan Pan

出版者: Springer Singapore

ISBN: 978-981-10-3267-7, 978-981-10-3268-4 (eBook)

出版年: 2017

页码: 1 pdf.

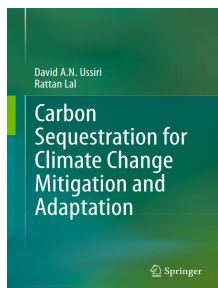
索书号: Oa2464

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摘要: This book focuses on an important technology for mineralizing and utilizing CO₂ instead of releasing it into the atmosphere. CO₂ mineralization and utilization demonstrated in the waste-to-resource supply chain can “reduce carbon dependency, promote resource and energy efficiency, and lessen environmental quality degradation,” thereby reducing environmental risks and increasing economic benefits towards Sustainable Development Goals (SDG). In this book, comprehensive information on CO₂ mineralization and utilization via

accelerated carbonation technology from theoretical and practical considerations was presented in 20 Chapters. It first introduces the concept of the carbon cycle from the thermodynamic point of view and then discusses principles and applications regarding environmental impact assessment of carbon capture, storage and utilization technologies. After that, it describes the theoretical and practical considerations for “Accelerated Carbonation (Mineralization)” including analytical methods, and systematically presents the carbonation mechanism and modeling (process chemistry, reaction kinetics and mass transfer) and system analysis (design and analysis of experiments, life cycle assessment and cost benefit analysis). It then provides physico-chemical properties of different types of feedstock for CO₂ mineralization and then explores the valorization of carbonated products as green materials. Lastly, an integral approach for waste treatment and resource recovery is introduced, and the carbonation system is critically assessed and optimized based on engineering, environmental, and economic (3E) analysis. The book is a valuable resource for readers who take scientific and practical interests in the current and future Accelerated Carbonation Technology for CO₂ Mineralization and Utilization.

Carbon sequestration for climate change mitigation and adaptation / 减缓和适应气候变化的碳封存



责任者: David A. N. Ussiri ; Rattan Lals.

出版者: Springer International Publishing AG.

ISBN: 978-3-319-53843-3, 978-3-319-53845-7(eBook)

出版年: 2017

页码: 1 pdf.

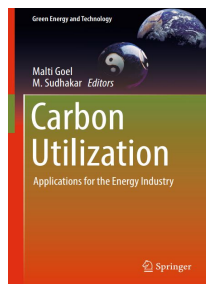
索书号: Oa2456

获取途径: 馆藏非书资料数据库

摘要: This volume sets out the scientific basis for the current understanding of climate change. It synthesizes and collates an extensive scientific knowledge to show why climate is changing, and the consequences of those changes. Starting with global carbon cycling over geological history of the Earth, the behavior of the carbon cycle is traced back millions of years prior to human influence and shows that the current atmospheric concentration of carbon dioxide is unprecedented, which cannot be found in geological records of at least the past two million years. This book sets the foundation for understanding the contemporary carbon cycling, and shows that the contemporary carbon cycling cannot be isolated from geologic history of carbon cycle. This volume also describes the role of carbon sequestration – both natural ecological, engineered and geoengineered options – for mitigating the increasing atmospheric CO₂ concentration. The role of emerging chemical sequestration and climate engineering as future alternatives to avoid dangerous temperature increase are explored. Although the targeted audience is the educators, students, researchers and

scientific community, the simplified analysis and synthesis of current and up to date scientific literature makes the volume easier to understand and a tool policy makers can use to make an informed policy decisions.

Carbon utilization : applications for the energy industry / 碳利用：能源工业的应用



责任者: Malti Goel ; M. Sudhakar editors.

出版者: Springer Nature Singapore Pte Ltd.

ISBN: 978-981-10-3351-3, 978-981-10-3352-0(eBook)

出版年: 2017

页码: 1 pdf.

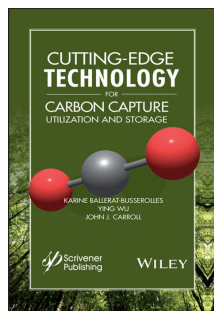
丛刊: Green energy and technology

索书号: Oa2460

获取途径: 馆藏非书资料数据库

摘要: This book provides in-depth information on topics relating to anthropogenic carbon dioxide utilization processes. Presenting a collection of state-of-the-art scientific reviews and research perspectives on carbon management strategies of relevance to the energy industry, it features contributions by leading scientists and technocrats across 19 chapters as an Indian contribution. In the energy industry, new processes for carbon dioxide removal and recycling are developing quickly, and it is in this context that the book provides an opportunity to review the current status of and promote efforts to achieve effective carbon capture and management. The contents presented here will prove useful to researchers, students, industry experts, scientists and policymakers alike.

Cutting-edge Technology for Carbon Capture, Utilization, and Storage / 碳捕获、利用和储存的尖端技术



责任者: Karine Ballerat-Busserolles, Ying (Alice) Wu and John J. Carroll.

出版者: Wiley/Scrivener Publishing LLC.

ISBN: 978-1-119-36348-4

出版年: 2018

页码: 1 pdf.

索书号: Oa2462

获取途径: 馆藏非书资料数据库

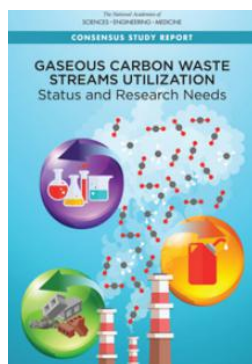
摘要: Of the 36 billion tons of carbon dioxide (CO₂) being emitted into Earth's atmosphere every year, only 40 million tons are able to be captured and stored. This

is just a fraction of what needs to be captured, if this technology is going to make any headway in the global march toward reversing, or at least reducing, climate change. CO₂ capture and storage has long been touted as one of the leading technologies for reducing global carbon emissions, and, even though it is being used effectively now, it is still an emerging technology that is constantly changing.

This volume, a collection of papers presented during the Cutting-Edge Technology for Carbon Capture, Utilization, and Storage (CETCCUS), held in Clermont-Ferrand, France in the fall of 2017, is dedicated to these technologies that surround CO₂ capture. Written by some of the most well-known engineers and scientists in the world on this topic, the editors, also globally known, have chosen the most important and cutting-edge papers that address these issues to present in this groundbreaking new volume, which follows their industry-leading series, *Advances in Natural Gas Engineering*, a seven-volume series also available from Wiley-Scrivener.

With the ratification of the Paris Agreement, many countries are now committing to making real progress toward reducing carbon emissions, and this technology is, as has been discussed for years, one of the most important technologies for doing that. This volume is a must-have for any engineer or scientist working in this field.

Gaseous carbon waste streams utilization : status and research needs / 气态碳废物流利用现状及研究需求



责任者: Committee on Developing a Research Agenda for Utilization of Gaseous Carbon Waste Streams Board on Chemical Sciences and Technology Division of Earth and Life Studies.

出版者: The National Academies Press

ISBN: 978-0-309-48336-0, 0-309-48336-0

出版年: 2019

页码: 1 pdf.

索书号: Oa2459

获取途径: 馆藏非书资料数据库

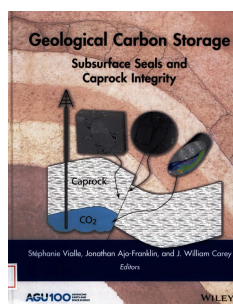
摘要: Globally, human activities release approximately 35,000 teragrams (Tg) (million metric tons [MMT]) of carbon dioxide and 320 Tg (MMT) of methane into the atmosphere each year. As researchers and policy makers search for strategies to mitigate the buildup of these greenhouse gases, increasing attention has turned to the capture of gaseous carbon waste. Once captured, the gaseous carbon waste can either be geologically sequestered or put to productive use. Both options have costs, but utilization offers the opportunity for benefits from the use of the material. Carbon utilization technologies, as referred to in this report, convert gaseous carbon waste feedstocks (carbon dioxide or methane) into valuable products such as fuels, construction materials, plastics, and other useful products. These technologies have

the potential to transform waste streams into resources, reduce greenhouse gas emissions, and in some cases generate positive economic returns.

Only a small fraction of the carbon dioxide and methane emitted each year is currently being captured and used. Most carbon utilization technologies are in their infancy. The -Committee on Developing a Research Agenda for Utilization of Gaseous Carbon Waste Streams was convened by the National Academies of Sciences, Engineering, and Medicine at the request of the U.S. Department of Energy and Shell to assess research and development needs relevant to understanding and improving the commercial viability of carbon utilization technologies (see Box S-1). The report defines a research agenda to address the principal challenges associated with commercializing carbon utilization technologies. The report also identifies improvements needed in tools used for evaluating the economic and environmental attributes of carbon utilization technologies. Because an overarching goal of carbon utilization is to curb the accumulation of greenhouse gases in the atmosphere, the study focuses on technologies that have the potential to utilize gaseous carbon waste with a net reduction in greenhouse gas emissions.

The report assumes that large volumes of gaseous carbon waste, especially carbon dioxide, will continue to be generated in the coming decades through continued use of fossil fuels. While the study considers utilization technologies for both carbon dioxide and methane, the larger focus is on carbon dioxide.¹ The report is intended to help inform decision making surrounding the development and deployment of carbon utilization technologies under a variety of circumstances, whether motivated by a goal to improve processes for making carbon-based products, to generate revenue, or to achieve environmental goals.

Geological carbon storage : subsurface seals and caprock integrity / 地质碳储量：地下封层和盖层完整性



责任者: edited by : Trevor M. Letcher.

出版者: Academic Pressis [an imprint of Elsevier]

ISBN: 978-0-12-814104-5

出版年: 2019

页码: 1 pdf.

丛刊: Geophysical monograph ; 238

索书号: P/260.64/G29m/238

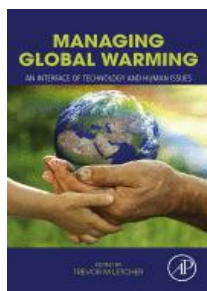
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摘要: Seals and caprocks are an essential component of subsurface hydrogeological systems, guiding the movement and entrapment of hydrocarbon and other fluids. Geological Carbon Storage: Subsurface Seals and Caprock Integrity offers a survey of the wealth of recent scientific work on caprock integrity with a focus on the geological controls of permanent and safe carbon dioxide storage, and the commercial

deployment of geological carbon storage.

The book highlights include: Low-permeability rock characterization from the pore scale to the core scale. Flow and transport properties of low-permeability rocks. Fundamentals of fracture generation, self-healing, and permeability. Coupled geochemical, transport and geomechanical processes in caprock. Analysis of caprock behavior from natural analogues. Geochemical and geophysical monitoring techniques of caprock failure and integrity. Potential environmental impacts of carbon dioxide migration on groundwater resources. Carbon dioxide leakage mitigation and remediation techniques.

Managing global warming : an interface of technology and human issues / 管理全球变暖：技术与人类问题的结合点



责任者: edited by : Trevor M. Letcher.

出版者: Academic Pressis [an imprint of Elsevier]

ISBN: 978-0-12-814104-5

出版年: 2019

页码: 1 pdf.

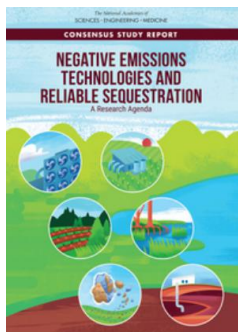
索书号: Oa2453

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摘要: Managing Global Warming: An Interface of Technology and Human Issues discusses the causes of global warming, the options available to solve global warming problems, and how each option can be realistically implemented. It is the first book based on scientific content that presents an overall reference on both global warming and its solutions in one volume. Containing authoritative chapters written by scientists and engineers working in the field, each chapter includes the very latest research and references on the potential impact of wind, solar, hydro, geo-engineering and other energy technologies on climate change.

With this wide ranging set of topics and solutions, engineers, professors, leaders and policymakers will find this to be a valuable handbook for their research and work.

Negative emissions technologies and reliable sequestration : a research agenda / 负排放技术与可靠封存：研究议程



责任者: Committee on Developing a Research Agenda for Carbon Dioxide Removal and Reliable Sequestration ; Board on Atmospheric Sciences and Climate ; Board on Energy and Environmental Systems ; Board on Agriculture and Natural Resources ; Board on Earth Sciences and Resources ; Board on Chemical Sciences and Technology ; Ocean Studies Board ; Division on Earth and Life Studies.

出版者: The National Academies Press

ISBN: 978-0-309-48452-7, 0-309-48452-9

出版年: 2019

页码: 1 pdf.

索书号: Oa2465

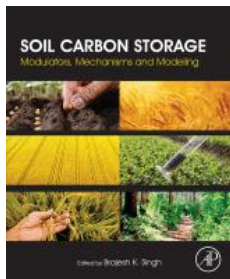
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摘要: This report's statements about the need for an emissions reduction of a particular amount should not be interpreted as normative statements (a value judgment on what should be), but rather as statements about the action required given a decision to meet the Paris agreement or to provide NETs to the international market created by such a decision by most nations, many corporations, and several U.S. states and local governments. Nonetheless, the committee is acutely aware that the U.S. government has announced an intention to withdraw from the Paris agreement.

It is useful to ask how the report's conclusions would differ without the constraint of the Paris agreement. The committee believes that its conclusions and recommendations are generally robust, simply because the economic rewards for success would be so large. This is due to the ongoing commitment by the U.S. government to reduce the contributors to climate change, as evidenced by the recently adopted 45Q rule that provides a \$50/t CO₂ tax credit for capture and storage,^b and the ongoing commitment to the Paris agreement by states, local governments, corporations, and other countries.

Soil carbon storage : modulators, mechanisms and modeling / 土壤碳储量：调节剂、机理和模型

土壤碳储量：调节剂、机理和模型



责任者: edited by : Brajesh K. Singh.

出版者: Academic Pressis [an imprint of Elsevier]

ISBN: 978-0-12-812766-7

出版年: 2018

页码: 1 pdf.

索书号: Oa2452

获取途径: 馆藏非书资料数据库

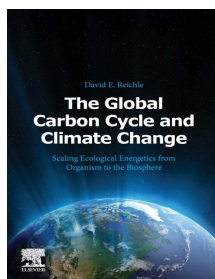
摘要： Soil Carbon Storage: Modulators, Mechanisms and Modeling takes a novel approach to the issue of soil carbon storage by considering soil C sequestration as a function of the interaction between biotic (e.g. microbes and plants) and abiotic (climate, soil types, management practices) modulators as a key driver of soil C. These modulators are central to C balance through their processing of C from both plant inputs and native soil organic matter. This book considers this concept in the light of state-of-the-art methodologies that elucidate these interactions and increase our understanding of a vitally important, but poorly characterized component of the global C cycle.

The book provides soil scientists with a comprehensive, mechanistic, quantitative and predictive understanding of soil carbon storage. It presents a new framework that can be included in predictive models and management practices for better prediction and enhanced C storage in soils.

The global carbon cycle and climate change : scaling ecological

energetics from organism to biosphere / 全球碳循环与气候变化：从有机体到生物圈的尺度生态能量学

化：从有机体到生物圈的尺度生态能量学



责任者: David E. Reichle.

出版者: Elsevier

ISBN: 978-0-12-820244-9

出版年: 2020

页码: 1 pdf.

索书号: Oa2455

获取途径: 馆藏非书资料数据库

摘要： The Global Carbon Cycle and Climate Change examines the global carbon cycle and the energy balance of the biosphere, following carbon and energy through increasingly complex levels of metabolism from cells to ecosystems. Utilizing

scientific explanations, analyses of ecosystem functions, extensive references, and cutting-edge examples of energy flow in ecosystems, it is an essential resource to aid in understanding the scientific basis of the role played by ecological systems in climate change.

This book addresses the need to understand the global carbon cycle and the interrelationships among the disciplines of biology, chemistry, and physics in a holistic perspective. The Global Carbon Cycle and Climate Change is a compendium of easily accessible, technical information that provides a clear understanding of energy flow, ecosystem dynamics, the biosphere, and climate change.