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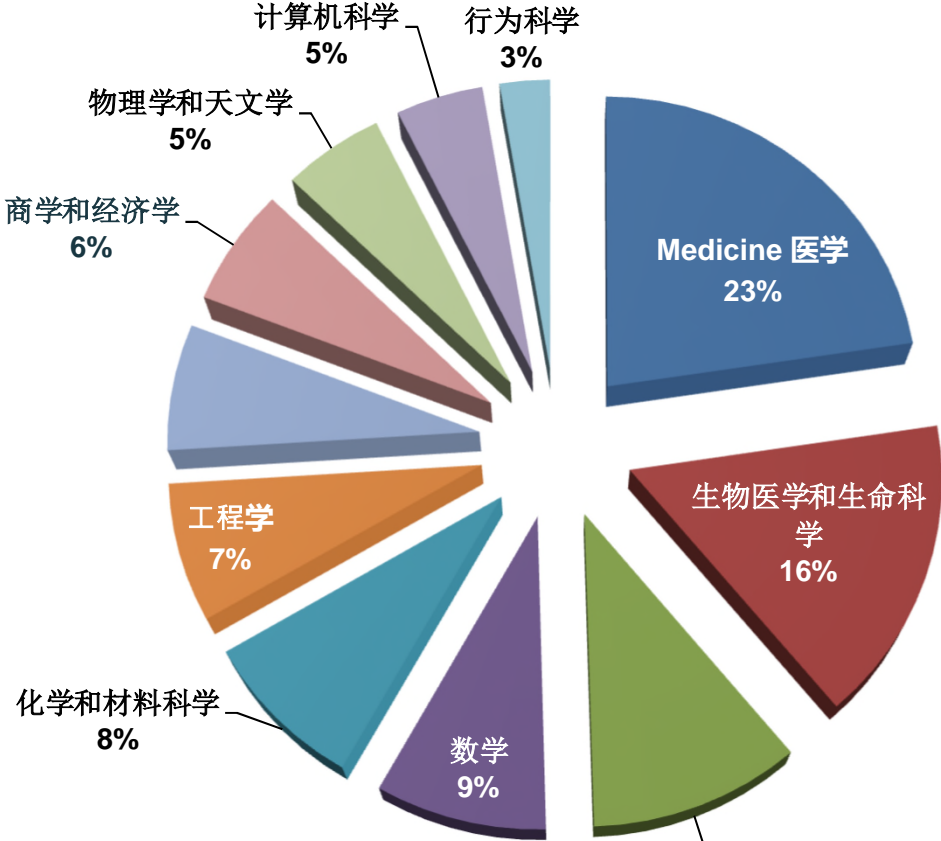
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# Springer电子期刊—学科分类

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<b>Science, Technology and Engineering (STE)</b> 科技工程专辑	Chemistry and Materials Science	化学和材料科学
	Computer Science	计算机科学
	Earth and Environmental Science	地球环境科学
	Engineering	工程学
	Mathematics and Statistics	数学和统计学
	Physics and Astronomy	物理学和天文学
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	Medicine	医学
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# Springer电子期刊—学科分类示意图



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**[Link.springer.com](https://link.springer.com)**

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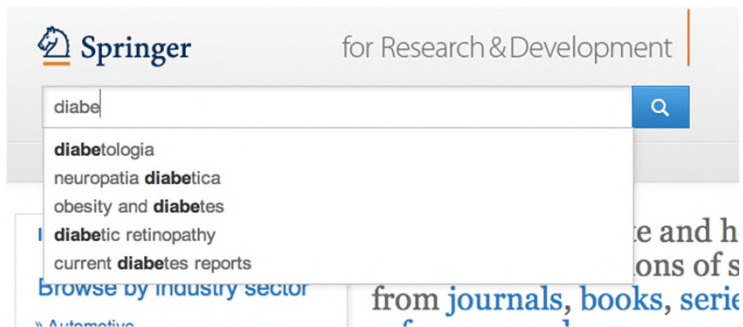
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Within this Article:

- » Introduction
- » Patients and methods
- » Results
- » Discussion
- » References



## Results

### Patient characteristics

Between 11/04/2003 and 12/13/2004, seven patients were seen in this initial cohort. Table 1 summarizes the baseline characteristics.

**Table 1** Baseline demographics and clinical characteristics

Baseline characteristics
Patients evaluable/enrolled
Gender: Female %

改进后的 HTML

European Biophysics Journal with Biophysics Letters
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10.1007/s00249-012-0820-x

Review

### Validation of macro

Michal Hammel<sup>1</sup>

(1) Lawrence Berkeley National Laboratory,

Michal Hammel  
Email: [mhammel@lbl.gov](mailto:mhammel@lbl.gov)

Received: 4 March 2012 Revised: 22 April 2012

#### Abstract

The dynamics of macromolecular conformations are critical to the action of cellular processes. Nuclear magnetic resonance (NMR), solution scattering, and dynamic light scattering (DLS) are powerful tools to study dynamic molecular machines. This review combines solution-scattering data with high-resolution methods used to calculate theoretical SAXS profiles. We enhance computational techniques used for conformational detail, the knowledge gained from ensemble analysis, X-ray crystallography, NMR, and computational methods.

**Keywords** Small-angle X-ray scattering (SAXS)

Special Issue: Scattering techniques in biological systems

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10.1007/s00249-012-0820-x

Review

### Validation of macromolecular flexibility in solution by small-angle X-ray scattering (SAXS)

Michal Hammel<sup>1</sup>

(1) Lawrence Berkeley National Laboratory, Physical Biosciences Division, Berkeley, CA, USA

Michal Hammel  
Email: [mhammel@lbl.gov](mailto:mhammel@lbl.gov)

Received: 4 March 2012

Revised: 22 April 2012

Accepted: 5 May 2012

Published online: 26 May 2012

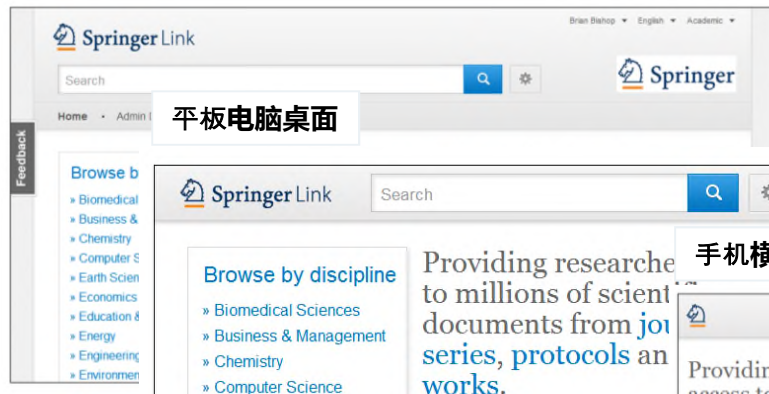
#### Abstract

The dynamics of macromolecular conformations are critical to the action of cellular processes. Nuclear magnetic resonance (NMR), solution scattering, and dynamic light scattering (DLS) are powerful tools to study dynamic molecular machines. This review combines solution-scattering data with high-resolution methods used to calculate theoretical SAXS profiles. We enhance computational techniques used for conformational detail, the knowledge gained from ensemble analysis, X-ray crystallography, NMR, and computational methods. This review addresses theoretical and practical concepts, concerns, and considers techniques in conjunction with computational methods to productively combine solution and high-resolution structures. I discuss the principal means of direct identification of conformations from SAXS data followed by critical concerns about the methods used to calculate from high-resolution structures. The SAXS profile is a direct interrogation of the conformational ensemble and techniques such as, for example, minimal ensemble search (MES), enhance computational techniques used for conformational sampling, and dynamic light scattering (DLS) experiments by describing the SAXS profiles as population-weighted thermodynamic ensembles. Recent developments in computational techniques used for conformational sampling, such as, for example, minimal ensemble search (MES), enhance computational techniques used for conformational sampling, and dynamic light scattering (DLS) experiments provide a basis for assessing the level of the flexibility within a sample. However, these approaches sacrifice atomic detail, the knowledge gained from ensemble analysis, and the ability to develop hypotheses and guiding biochemical experiments. Examples of the use

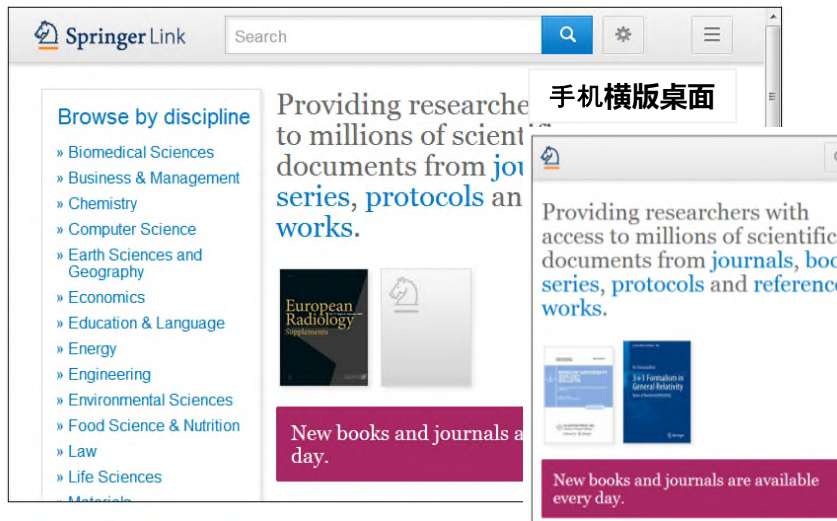
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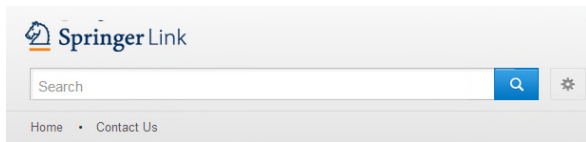
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Chapter: Relevance, Newest First, Oldest First

Comprendre le score gériatrique: recommandations de la « Task Force on CGA of the International Society of Geriatric Oncology (SIOG) »

Un quart des Européens aura plus de 65 ans d'ici 2030, et dans ce segment l'incidence des cancers augmente à 11 fois celle du sujet plus jeune. Pour mieux évaluer ces personnes sur le plan social et médical,...

M. Agnès le Gars, du sein (2007)

3.349 Result(s) for 'mrsa'

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Show documents published between 1867 and 2012 (Available 1867 - 2012) (highlighted in a red box)

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pediatric cardiology

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Content Type

Article	7.958
Chapter	969
Reference Work Entry	30

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Reference Work Entry	4
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Life Sciences	246
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Biochemistry	126
Biochemistry & Biophysics	126
Energy Technology	106
Microbiology	96

**Published In** see all

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Biomass Conversion and Biorefinery	54
Applied Microbiology and Biotechnology	51
BioEnergy Research	25
Journal of Industrial Microbiology & Biotechnology	24

Article

**Biorefinery: an Efficient Way to Sustainable Development of Chemical Industry—a Special Issue for International Conference on Biorefinery (ICB 07) and the 5th International Conference on Separation Science and Technology (ICSST2007)**

Tianwei Tan, Jian-He Xu in *Applied Biochemistry and Biotechnology* (2010)

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Chapter

**Integrated Forest Biorefinery**

Biorefining is an exciting concept for the pulp and paper industry, however in many ways, the industry has been considering its implementation for decades (Wising and Stuart 2006...). There have been many example...

Pratima Bajpai in *Biotechnology for Pulp and Paper Processing* (2012)

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Chapter

**Biorefinery**

A biorefinery is a facility that integrates biomass conversion processes and equipment to produce fuels, power, and value-added chemicals from biomass. The biorefinery concept is analogous to today's crude oil...

*Biorefineries* (2010)

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Article

**Synthesis of an integrated biorefinery via the C–H–O ternary diagram**

An integrated **biorefinery** is designed to handle a wide variety ... ) and can produce a broad range of products (e.g., biofuel, biochemicals, etc.) via multiple conversion pathways and technologies.

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within Journal

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Journal

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Volume 2011 / 2011 - Volume 2012 / 2012

(1)

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Journal

Biology o

Volume 1 / 20

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(2)

Journal

Biology E

Volume 1 / 20

EURASIP Journal on  
Systems Biology

ISSN: (Print) 1687-4153 (Online)

## Description

The overall aim of EURASIP Journal on Bioinform results related to signal processing and bioinform area of applications into the core new disciplines journal is intended to offer a common platform for processing, bioinformatics, statisti ... [show all](#)

This article is part of  
Computational Systems Biology  
EURASIP Journal on Bioinformatics and Systems Biology  
June 2012, 2012-5

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(3)

## Phase computations and phase models for discrete molecular oscillators

Onder Suvak, Alper Demir

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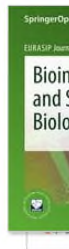
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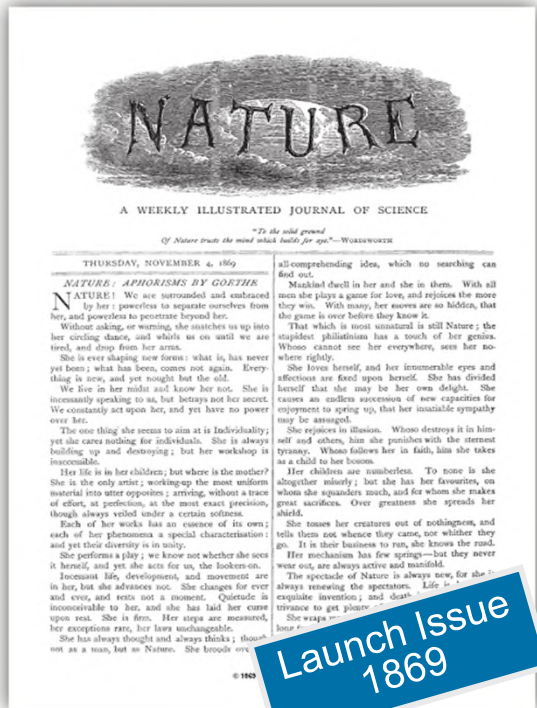
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» 1. Introd

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Nature 电子期刊

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- 1869年11月4日创刊
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1880 : 指纹用于刑侦技术

1896 : 首次发现 X 射线

1903 : 发现镭的放射性衰变

1925 : 发现非洲类人猿——人类的起源

1927 : 发现电子的波动性——电子显微镜的基石

1932 : 破解原子由质子、中子和电子组成——原子能时代的开端

1953 : 发现DNA的双螺旋结构——开启生物学的黄金时代

1958 : 首次确定蛋白质结构——蛋白质组学

1961 : 破解DNA到蛋白质的编码过程

1963 : 利用地磁证据证明大陆板块漂移学说

1978 : 合成第一个单克隆抗体——癌症的靶向治疗

1983 : 发现艾滋病毒

1985 : 在南极上空发现臭氧空洞——引发全球对环境问题的关注

1991 : 纳米碳管的合成——开启新材料时代

1992 : 发现30万年前的尼安德特人头骨残骸

1994 : 首次合成强力抗癌新药——紫杉醇

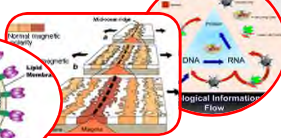
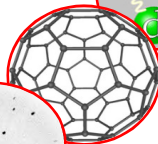
1995 : 首次发现太阳系外的行星

1997 : 克隆羊多莉诞生

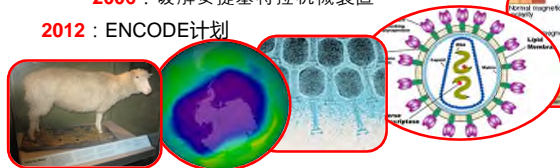
2001 : 人类基因组计划

2006 : 破解安提基特拉机械装置

2012 : ENCODE计划



<http://www.nature.com/nature/history/index.html>



# Nature引领科学期刊的发展



- **Nature**是被引最多的多学科期刊，已连续9年在多学科领域影响因子排名第一。\*《自然》不断启迪着全世界研究人员、临床医师以及学术和行业专家们，并为他们带来宝贵的科学知识。
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- 22种《自然综述》系列期刊，提供权威的、易于理解的、意义重大的综述内容。无论在哪一领域，高质量的图像和精炼的内容都提供背景知识和相关链接。
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\*以上期刊指标数据源于2020年*Journal Citation Reports, Clarivate Analytics*



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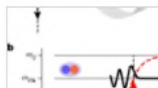
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## Afghanistan's terrified scientists predict huge research losses

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### US COVID origins report: researchers pleased with scientific approach

Intelligence investigation is inconclusive on virus's origins, but finds SARS-CoV-2 wasn't weaponized and is unlikely to have been engineered.

Amy Maxmen

News 27 Aug 2021

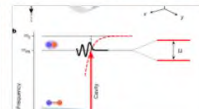


### Can artificially altered clouds save the Great Barrier Reef?

Australian scientists are rushing to develop new technologies — such as ways to block sunlight — to help preserve corals in the face of climate change.

Jeff Tollefson

News Feature 25 Aug 2021



### Universal pair polaritons in a strongly interacting Fermi gas

Directly coupling cavity photons to the photo-association resonances of pairs of atoms in a strongly interacting Fermi gas generates pair polaritons—hybrid excitations coherently mixing photons, atom pairs and molecules.

Hideki Konishi, Kevin Roux ... Jean-Philippe Brantut

Article 25 Aug 2021



### Daily briefing: Europe's first gene-edited wheat trial

UK green-lights trial of CRISPR-edited wheat developed to reduce a cancer-causing chemical in toast. Plus, inside a US intelligence report on the origins of SARS-CoV-2 and the Pfizer labs where scientists grapple with coronavirus variants.

Flora Graham

Nature Briefing 31 Aug 2021



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Amy Maxmen

News 27 Aug 2021

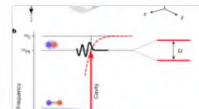


### Can artificially altered clouds save the Great Barrier Reef?

Australian scientists are rushing to develop new technologies — such as ways to block sunlight — to help preserve corals in the face of climate change.

Jeff Tollefson

News Feature 25 Aug 2021



### Universal pair polaritons in a strongly interacting Fermi gas

Directly coupling cavity photons to the photo-association resonances of pairs of atoms in a strongly interacting Fermi gas generates pair polaritons—hybrid excitations coherently mixing photons, atom pairs and molecules.

Hideki Konishi, Kevin Roux ... Jean-Philippe Brantut

Article 25 Aug 2021



### Daily briefing: Europe's first gene-edited wheat trial

UK green-lights trial of CRISPR-edited wheat developed to reduce a cancer-causing chemical in toast. Plus, inside a US intelligence report on the origins of SARS-CoV-2 and the Pfizer labs where scientists grapple with coronavirus variants.

Flora Graham

Nature Briefing 31 Aug 2021



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时评分析由Nature Portfolio编辑撰写，同时编辑们也会向权威学者邀稿，就各学科领域的发展发表意见。

News & Comment >

The screenshot shows a grid of article cards under the 'News & Comment' header. The cards include:

- The global research community must not abandon Afghanistan** (Editorial, 01 Sept 2021)
- Demand five precepts to aid social-media watchdogs** (World View, 31 Aug 2021)
- What's next for lab-grown human embryos?** (News Feature, 31 Aug 2021)
- The world's scientific panel on biodiversity needs a bigger role** (Editorial, 31 Aug 2021)
- Rogue antibodies involved in almost one-fifth of COVID deaths** (News, 31 Aug 2021)
- Food systems: seven priorities to end hunger and protect the planet** (Comment, 30 Aug 2021)
- Witness in US climate-change law suit tells all** (Book Review, 30 Aug 2021)

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nature > news > article

NEWS | 31 August 2021

## Rogue antibodies involved in almost one-fifth of COVID deaths

The self-targeting antibodies attack type 1 Interferons that play a key role in fighting infection.

Diana Kwon



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Virology Immunology SARS-CoV-2

文章所涵盖学科、主题

SPRINGER NATURE

# 发现最受关注的热点文章

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## Trending - Altmetric



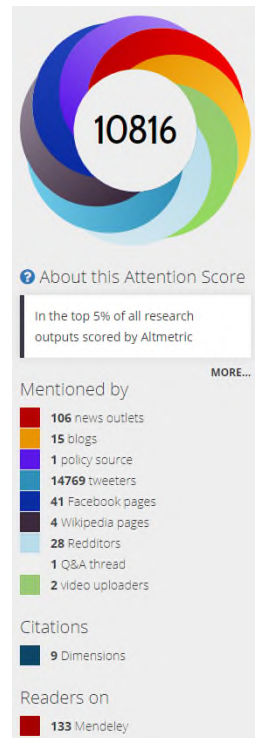
**Delta's rise is fuelled by rampant spread from people who feel fine**



**Origins of SARS-CoV-2: window is closing for key scientific studies**



**Flawed ivermectin preprint highlights challenges of COVID drug studies**



# 检索

在nature.com平台上可简捷、直观地找到您感兴趣的内容

The image shows the search interface of the Nature.com website. At the top right, there is a search bar with a magnifying glass icon and a 'Login' button. Below the search bar, there are three callout boxes with arrows pointing to specific features: 1. A box on the left says '输入任意关键词以进行一般检索' (Enter any keyword for general search) pointing to the search input field. 2. A box below it says '指定检索范围：整个平台或当前期刊' (Specify search range: the entire platform or the current journal) pointing to a dropdown menu that is currently open, showing 'All journals' and 'This journal' (highlighted in blue). 3. A box at the bottom left says '高级检索可实现更精确的检索' (Advanced search can achieve more precise search) pointing to the 'Advanced search' link. Below the search bar, there is a 'Quick links' section with four links: 'Explore articles by subject', 'Find a job', 'Guide to authors', and 'Editorial policies'. A fourth callout box at the bottom says '快速链接：按学科浏览文章、查找自然职场发布的职位、作者指南、编辑出版政策' (Quick links: browse articles by discipline, find jobs posted by Nature, author guide, editorial and publishing policies) pointing to these links. In the top right corner, there is a separate callout box that says '检索框位于所有页面的右上角' (The search box is located in the top right corner of all pages) with an arrow pointing to the search bar.

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nanotechnology  [Advanced search](#)

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- Research Highlights 9) **Nanotechnology research increases significantly**
- 11 Aug 2021
- Nature Africa
- South Africa advances discovery efforts
- Scovian Lillian

- Research 8) **Nanotechnology makes biomass electrolysis more energy efficient than water electrolysis**
- 03 Jun 2014
- Nature Communications
- Volume: 5, P: 1-6
- Electrolytic water splitting requires high electrical energy consumption. Here, the authors report a new type of electrolyser that thanks to palladium-doped titania nanotubes oxidizes bio-alcohols, resulting in energy-convenient hydrogen generation as well as valuable chemical production.

Y. X. Chen, A. Lavacchi ... F. Vizza

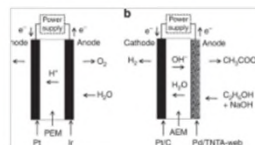
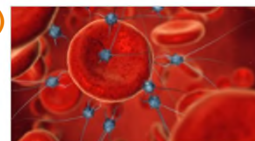
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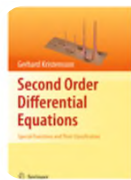


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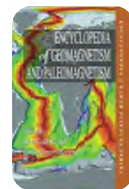
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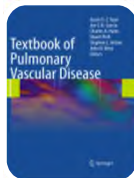
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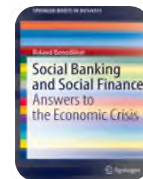
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Book

**Enterprise as an Instrument of Civilization**  
An Anthropological Approach to Business Administration  
Hirochika Nakamaki, Koichiro Hioki... in *Translational Systems Sciences* (2016)



Book

**Modern Stroke Rehabilitation through e-Health-based Entertainment**  
Emmanouela Voglatzaki, Artur Krukowski (2016)



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The screenshot shows the Springer website interface for the book 'Enterprise as an Instrument of Civilization'. At the top, there is a blue navigation bar with a download icon and the text 'Download Book (PDF, 3255 KB)' and a search box labeled 'Search within this book'. Below the navigation bar, the book's title and subtitle are displayed: 'Enterprise as an Instrument of Civilization' and 'An Anthropological Approach to Business Administration'. The editors' names and ISBN numbers are listed below the title. Two download buttons are visible: 'Download Book (PDF, 3255 KB)' and 'Download Book (ePub, 1212 KB)'. A 'Table of contents' section is shown with a list of chapters, including 'Front Matter' and 'Invitation to Keiei Jinruigaku, Anthropology of Business Administration'. On the right side, there is a 'Book Metrics' section showing 'Mentions: 1', 'Readers: 1', and 'Downloads: 8K'. Below this, there is a 'MyCopy Softcover Edition' section with a price of '24.99 EUR/USD/GBP/CHF' and a 'Buy Now' button. A 'Look Inside' button is also present next to the book cover image.

Translational Systems Sciences  
Volume 4 2016

## Enterprise as an Instrument of Civilization

An Anthropological Approach to Business Administration

**Editors:** Hirochika Nakamaki, Koichiro Hioki, Izumi Mitsui, Yoshiyuki Takeuchi  
**ISBN:** 978-4-431-54915-4 (Print) 978-4-431-54916-1 (Online)

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### Table of contents (15 chapters)

Front Matter	Pages i-xiv
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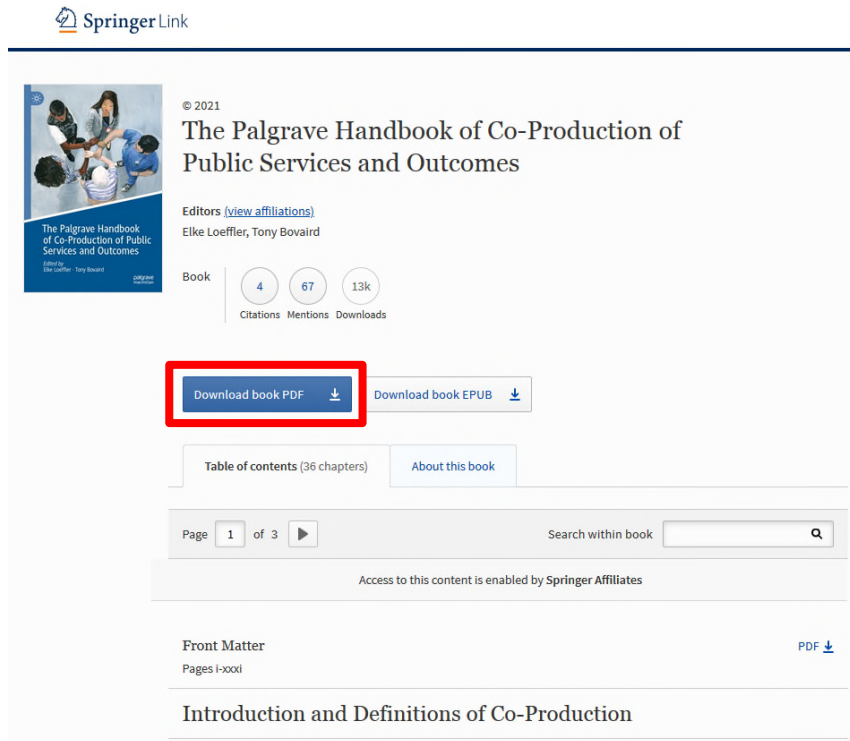
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Introduction and Definitions of Co-Production



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The screenshot shows a web page for a protocol. At the top, it says 'A Web-Based Protocol for Interprotein Contact Prediction by Deep Learning'. Below the title, it lists authors: Kangyong An, Hong Ding, Sheng Wang, Jinhua Xu. It also shows the publication date: 'First Online: 24 October 2018'. The abstract section begins with 'Identifying residue-residue contacts in protein-protein interactions or complexes is crucial for understanding protein and cell functions. DCA (Direct-coupling analysis) methods shed some light on this, but they need many sequence homologs to yield accurate predictions. Inspired by the success of our deep-learning method for intraprotein contact prediction, we have developed RaptorX-ComplexContact, a web server for interprotein residue-residue contact prediction. Given a pair of interacting protein sequences, RaptorX-ComplexContact first searches for their sequence homologs and finds two paired multiple sequence alignments (MSAs) based on genetic distance and phylogeny information, respectively. Then, RaptorX-ComplexContact...'

The page also includes sections for '1 Introduction' and '2 Materials'. The '1 Introduction' section states: 'Proteins play various roles in cellular and biochemical processes by physically interacting with other proteins or forming protein complexes [1, 2]. Studying protein-protein interactions (PPIs) at residue level is crucial for understanding protein functions in organisms. Experimental techniques have been greatly improved to determine protein complex structures, but they are still low throughput and costly [3, 4]. Therefore, developing effective computational methods to elucidate the 3D structure of a PPI is considered from the perspective...'

The '2 Materials' section lists requirements for using the RaptorX-ComplexContact server:

1. A personal computer with Internet connection and a web browser with JavaScript enabled. RaptorX-ComplexContact server is compatible with three popular web browsers: Google Chrome, Firefox, and Internet Explorer. Nevertheless, the former two browsers may be slightly better than the third one in visualizing the prediction results.
2. The amino-acid sequences or multiple sequence alignments (MSAs) of the query protein pair in FASTA format. Only the MSAs generated by HHblits are systematically tested although in principle any MSAs shall work.
3. The amino-acid sequences or multiple sequence alignments (MSAs) could also be uploaded to the server as text files.
4. The job name and e-mail address are optional, but a valid e-mail address is strongly recommended since it can facilitate job management and result retrieval.

The '3 Methods' section includes a sub-section '3.1 Job Submission' with two steps:

1. Open the hyperlink <http://raptorx.scripps.edu/ComplexContact/> in the web browser.
2. From the menu at the top of the page, select "New job."

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The screenshot shows the Springer Nature Experiments website. At the top, there is a navigation bar with the text "Take full access and help shape the product. For help contact us at [experiments@springernature.com](mailto:experiments@springernature.com)". Below this is the "Experiments" header. A prominent search bar is displayed with the text "Search over 60,000 protocols and methods:" and a search icon. Below the search bar, there are four tabs: "Nature Protocols", "Nature Methods", "Protocol Exchange", and "Springer Protocols". The main content area features a "Discover Experiments" section with the text "Find, evaluate and implement experiments across the life sciences with the new research solution for protocols and methods from Springer Nature." and a "Learn more" button. To the right of this text is an image of a microscope. Below the "Discover Experiments" section, there is a "Topics" section with two categories: "Molecular techniques" and "Microscopy techniques". The "Molecular techniques" category lists: High-Throughput Sequencing, In situ hybridisation, Recombinant protein expression, Single-molecule assay, CRISPR, Western blot, and ChIP-seq, Cross-linking. The "Microscopy techniques" category lists: Two-photon microscopy, Calcium imaging, Super-resolution microscopy, and Cryo-EM. A green gear icon is next to the Molecular techniques list, and a green microscope icon is next to the Microscopy techniques list.

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The screenshot shows a search results page for "coronavirus pcr" on the Springer Nature Experiments platform. The search bar at the top contains the query "coronavirus pcr". Below the search bar, it indicates "19 results for 'coronavirus pcr'". The results are filtered by "Technique: PCR" and "Organism: Alphacoronavirus". The left sidebar contains various filters: "Publication Year" (2007 to 2020), "Technique" (with a search box and a list of techniques like Reverse Transcription PCR, Transfection, etc.), "Antibody BETA", and "Source" (Springer, Methods In Molecular Biology, Springer Protocols Handbooks). The main content area shows two search results, each with a title, author, abstract, and download count. The first result is "An RT-PCR Assay for Detection of Infectious Bronchitis Coronavirus Serotypes" by Junfeng Sun and Shengwang Liu, with 818 downloads. The second result is "A Multiplex Polymerase Chain Reaction for Differential Detection of Turkey Coronavirus from Chicken Infectious Bronchitis Virus and Bovine Coronavirus" by Chien Chang Loa, Ching Ching Wu, and Tsang Long Lin, with 836 downloads.

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2020  
Biochemical Characterization of Middle East Respiratory Syndrome Coronavirus Spike Protein Proteolytic Processing  
Springer Protocols

Authors:  
Gary R. Whitaker <sup>2</sup>, Jean K. Millet <sup>1, 2</sup>  
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Abstract

The coronavirus spike envelope glycoprotein is an essential viral component that mediates virus entry events. Biochemical assessment of the spike protein is critical for understanding structure-function relationships and the roles of the protein in the viral life cycle. Coronavirus spike proteins are typically proteolytically processed and activated by host cell enzymes such as trypsin-like proteases, cathepsins, or propeptin-convertases. Analysis of coronavirus spike proteins by western blot allows the visualization and assessment of proteolytic processing by endogenous or exogenous proteases. Here, we present a method based on western blot analysis to investigate spike protein proteolytic cleavage by transient transfection of HEK-293 T cells allowing expression of the spike protein of the highly pathogenic Middle East respiratory syndrome coronavirus in the presence or absence of a cellular trypsin-like transmembrane serine protease, matriptase. Such analysis enables the characterization of cleavage patterns produced by a host protease on a coronavirus spike glycoprotein. [View Article Online](#)

Figures (3) & Videos (0)

Fig 1

N NTD S1/S2 S2  
S1 receptor binding S2 fusion machinery

Keywords

Techniques:  
Transfection, Western Blot, Radioimmunoassay, Cell And Tissue Culture, PAGE, Cell Lysis, Transient Transfection, Electrophoresis

Models:  
Bos taurus, Alphacoronavirus, Dryobates capillaris, Middle East respiratory syndrome-related coronavirus, Mus musculus

Others:  
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Ricardo Rizo & Alberto Luisini <sup>1</sup>, 2016, Springer Protocols

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Susan D. Chapple & Michael R. Dyson <sup>1</sup>, 2014, Springer Protocols

Drosophila S2 Schneider Cells: A Useful Tool for Rebuilding and Redesigning Approaches in Synthetic Biology  
Jiangyong Yang & Michael Reib <sup>1</sup>, 2012, Springer Protocols

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**Cell and tissue culture techniques**

## Two-photon Microscopy Protocols And Methods



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
*Nature Methods* (2005) Review Article

#### Deep tissue two-photon microscopy

Fritjof Helmchen , Winfried Denk 

With few exceptions biological tissues strongly scatter light, making high-resolution deep imaging impossible for traditional—including confocal—fluorescence microscopy. Nonlinear optical microscopy, in particular two-photon-excited fluorescence ...more

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Springer Nature Experiments

Q e.g. protocol, technique, organism...

Antibody Data Search Beta

Protein: Not specified

## Anti-Rabbit IgG antibody

Type: Secondary





Used in techniques: Indirect immunolabeling, Fluorescence Cross-correlation Spectroscopy, Flow Cytometry, Immunostaining, Immunofluorescence, Western Blot, Immunolabeling, Fluorescence Microscopy, TAI-FISH

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Technique	Host	Concentration	Supplier Details	Conjugate	Buffer/Solution	Figure	Protocol
Immunostaining	Gallus gallus	0.5% (vol/vol)	Invitrogen, cat. no. A21441   Invitrogen, cat. no. A 21422	Alexa Fluor 488   Alexa Fluor 594	Dulbecco's phosphate buffered saline DPBS		<a href="#">Mesoscopic hydrogel molding to control the 3D geometry of bioartificial muscle tissues</a>
Immunolabeling	Capra hircus	Dilute 1:1,000	Invitrogen, cat. no. A11034	Alexa Fluor 488	PBS without calcium and magnesium PBS with 1% (vol/vol) FBS		<a href="#">Derivation and characterization of mouse embryonic stem cells from permissive and nonpermissive strains</a>
Fluorescence Cross-correlation Spectroscopy	Capra hircus	25 µgml <sup>-1</sup>	Molecular Probes/Invitrogen	Alexa488   Alexa633	Antibody dilution buffer AD buffer; PBS, 0.1% bovine serum albumin		<a href="#">One-step analysis of protein complexes in microliters of cell lysate using indirect immunolabeling &amp; fluorescence cross-correlation spectroscopy</a>
Indirect immunolabeling	Capra hircus	25 µgml <sup>-1</sup>	Molecular Probes/Invitrogen	Alexa488   Alexa633	Antibody dilution buffer AD buffer; PBS, 0.1% bovine serum albumin		<a href="#">One-step analysis of protein complexes in microliters of cell lysate using indirect immunolabeling &amp; fluorescence cross-correlation spectroscopy</a>
Western Blot	Capra hircus		Jackson ImmunoResearch, cat. no. 111-036-045	Peroxidase			<a href="#">Antibody-coupled siRNA as an efficient method for in vivo mRNA knockdown</a>
Western Blot	Bos taurus	80 ng/ml	Santa Cruz Biotechnology, cat. no. sc-2374	horseradish peroxidase HRP	blocking buffer		<a href="#">The cellular thermal shift assay for evaluating drug target interactions in cells</a>

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3.0 Einleitung

[Lit. S. 275

## 3 Crystallographic and magnetic properties of perovskite and perovskite-related compounds\*)

### 3.0 Introduction — Einleitung

#### 3.0.1 General remarks — Allgemeines

The perovskites form a family of compounds having a crystal structure similar to that of the mineral perovskite,  $\text{CaTiO}_3$ . There are two classes of materials crystallizing with this general structure type: primarily ionic materials having the ideal chemical formula  $\text{ABX}_3$  (A = larger cation, B = smaller cation, X = anion), and alloys having the ideal formula  $\text{M}^i\text{M}^j\text{X}_3$  (X = interstitial atom, M<sup>i</sup> and M<sup>j</sup> are metal atoms). Of these two classes, the former is much larger and the more important.

The stability of the  $\text{ABX}_3$  perovskite structure is primarily derived from the electrostatic (Madelung) energy achieved if cations occupy corner-shared octahedra. Thus the first prerequisite for a stable  $\text{ABX}_3$  perovskite is the existence of stable, polar octahedral-site building blocks. This, in turn, requires that the B cation have a preference for octahedral coordination and that there be an effective charge on the B cation. Since any A cation must occupy the relatively large anionic interstice created by corner-shared octahedra, a second requisite is an appropriate size for the A cation. Where it is too large, the B-X bond length cannot be optimized, and hexagonal stacking with face-shared octahedra becomes competitive. Where the A cation is too small, A-X bonding stabilizes structures having a smaller anionic coordination about the A cation. Thus  $\text{ABX}_3$  perovskites are commonly found in fluorides and oxides having B cations with a preference energy for octahedral coordination. By contrast, the chlorides and sulfides, having larger anions, not only require the largest A cations, but also form layer structures, where the A cations are missing, because they have anionic orbitals energetically available for orbital hybridization.

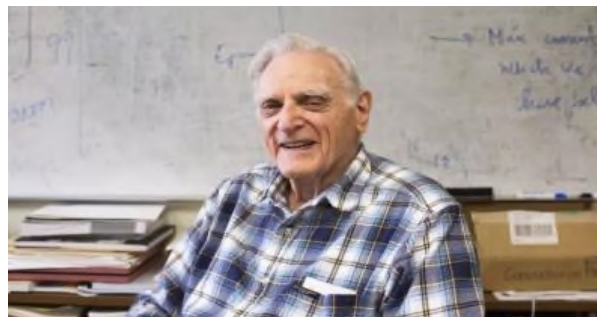
There are many perovskite-related structures, and these have been included in these tables. For example, the structure can tolerate mixed systems such as  $\text{A}_{1-x}\text{A}'_x\text{B}_2\text{X}_6$  and  $\text{AB}_{1-x}\text{B}'_x\text{X}_3$ . A cationic vacancy □ as in  $\text{Ca}_{1-x}\text{A}_x\text{B}_2\text{X}_6$  and cationic ordering as in  $\text{A}_2\text{B}_2\text{M}_2\text{X}_6$ . Although anion-deficient perovskites have been reported many times, the anion vacancies □ are probably not distributed randomly. In compounds containing  $\text{Fe}^{2+}$  ions, for example, they appear to condense in pairs at individual B-site octahedra to convert the local anion interstice from an octahedron to a tetrahedron. In

\*) This work was sponsored by the U. S. Air Force.

Die Perovskite sind eine Gruppe von Verbindungen mit der gleichen Kristallstruktur wie das Mineral Perowskit,  $\text{CaTiO}_3$ . Man unterscheidet zwei Klassen von Substanzen, die in diesem allgemeinen Strukturtyp kristallisieren: in erster Linie Ionenverbindungen mit der idealen chemischen Formel  $\text{ABX}_3$  (A = größerer Kation, B = kleinerer Kation, X = Anion) und Legierungen mit der idealen Formel  $\text{M}^i\text{M}^j\text{X}_3$  (X = Zwischengitteratom, M<sup>i</sup> und M<sup>j</sup> = Metallatome). Von diesen beiden Klassen ist die erstere wesentlich umfangreicher und wichtiger.

Die Stabilität der  $\text{ABX}_3$ -Perovskitstruktur beruht in erster Linie auf der elektrostatischen (Madelung-) Energie, die dann zustande kommt, wenn Kationen Oktaeder mit gemeinsamen Ecken besetzen. So ist die Existenz von stabilen, polaren Oktaeder-Bausteinen die erste Vorbedingung für ein stabiles  $\text{ABX}_3$ -Perovskit. Dies wiederum erfordert, daß das B-Kation die Oktaeder-Koordination bevorzugt und daß beim B-Kation eine effektive Ladung existiert. Da ein jedes A-Kation die relativ große Anionen-Lücke besetzen muß, die zwischen Oktaedern mit gemeinsamen Ecken entsteht, ist die passende Größe des A-Kations die zweite Vorbedingung. Wenn das A-Kation zu groß ist, läßt sich der optimale B-X-Bindungslängenzustand nicht erreichen, und eine hexagonale Packung von Oktaedern mit gemeinsamen Flächen kann ebenso auftreten. Wenn das A-Kation zu klein ist, ergibt die A-X-Bindung Strukturen mit einer kleineren Anionen-Koordination um das A-Kation. Daher sind  $\text{ABX}_3$ -Perovskite gewöhnlich unter den Fluoriden und Oxiden zu finden, in denen die B-Kationen Oktaeder-Koordination energetisch bevorzugen. Dagegen sind Chloride und Sulfide, die größere Anionen haben, nicht nur die größten A-Kationen, sondern sie bilden, weil sie anionische d-Elektronenbindungen mit der richtigen Energie für eine kleine Hybridisierung haben, auch Schichtstrukturen, bei denen die A-Kationen ganz fehlen.

Es gibt viele dem Perowskit verwandte Strukturen, die in diesen Tabellen aufgenommen wurden. Zum Beispiel können gemischte Systeme wie  $\text{A}_{1-x}\text{A}'_x\text{B}_2\text{X}_6$  und  $\text{AB}_{1-x}\text{B}'_x\text{X}_3$  mit dieser Struktur auftreten, weiter A-Kationlücken □ wie in  $\text{Ca}_{1-x}\text{A}_x\text{B}_2\text{X}_6$  und geordnete Kationen wie in  $\text{A}_2\text{B}_2\text{M}_2\text{X}_6$ . Über Perovskite mit Anionendefizit, ist schon häufig berichtet worden, vermutlich sind die Anionendefizite □ nicht willkürlich verteilt. In Verbindungen, die  $\text{Fe}^{2+}$ -Ionen enthalten, scheinen sie z. B. paarweise im Oktaeder eines einzelnen B-Platzes zusammenzutreffen und die



John B. Goodenough , 2019 Nobel Prize

Group III Condensed Matter  
Volume 4  
Magnetic and Other Properties of Oxides and Related Compounds\*

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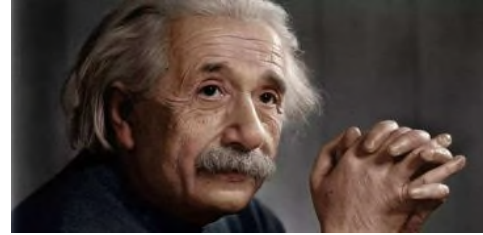
## ANNALEN DER PHYSIK.

### 9. Die Plancksche Theorie der Strahlung und die Theorie der spezifischen Wärme; von A. Einstein.

In zwei früheren Arbeiten<sup>1)</sup> habe ich gezeigt, daß die Interpretation des Energieverteilungsgesetzes der schwarzen Strahlung im Sinne der Boltzmannschen Theorie des zweiten Hauptsatzes uns zu einer neuen Auffassung der Phänomene der Lichtemission und Lichtabsorption führt, die zwar noch keineswegs den Charakter einer vollständigen Theorie besitzt, die aber insofern bemerkenswert ist, als sie das Verständnis einer Reihe von Gesetzmäßigkeiten erleichtert. In der vorliegenden Arbeit soll nun dargetan werden, daß die Theorie der Strahlung — und zwar speziell die Plancksche Theorie — zu einer Modifikation der molekular-kinetischen Theorie der Wärme führt, durch welche einige Schwierigkeiten beseitigt werden, die bisher der Durchführung jener Theorie im Wege standen. Auch wird sich ein gewisser Zusammenhang zwischen dem thermischen und optischen Verhalten fester Körper ergeben.

Bern, November 1906.

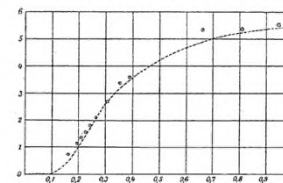
(Eingegangen 9. November 1906.)



Wir entnehmen ferner den Tabellen von Landolt und Börnstein einige Angaben über ultrarote Eigenschwingungen (metallische Reflexion, Reststrahlen) einiger durchsichtiger fester Körper; die beobachteten  $\lambda$  sind in nachstehender Tabelle unter „ $\lambda_{\text{beob.}}$ “ angegeben; die Zahlen unter „ $\lambda_{\text{ber.}}$ “ sind obiger Tabelle entnommen, soweit sie sich auf Atome von abnorm kleiner spezifischer Wärme beziehen; für die übrigen soll  $\lambda > 48 \mu$  sein.

Körper	$\lambda_{\text{beob.}}$	$\lambda_{\text{ber.}}$
CaF <sub>2</sub>	24, 31 $\mu$	33, > 48
NaCl		
KCl		
CaCO <sub>3</sub>	6,7; 1	
SiO <sub>2</sub>	8,5; 8	

190 A. Einstein. Plancksche Theorie der Strahlung etc.



betreffenden festen Stoffe vorkommen, für die spezifische Wärme pro Grammäquivalent den Ausdruck<sup>2)</sup>)

$$(8a) \quad c = 3,94 \sum \frac{\frac{3}{2} R \left( \frac{\beta h \nu}{T} \right)^3}{\left( e^{\frac{\beta h \nu}{T}} - 1 \right)^2}$$

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MSI Eureka 数据库	4,314 份关于二元和三元金属和半导体体系的相图报告 7646个交互式相图 71000书目报告	金属及合金材料的冶炼、制造和应用，高温高压环境下的特种材料(如钻探、航天)，燃料、能源等
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吸附性质数据库	4,331 组吸附等温曲线，涉及99种被吸附物和1,355种吸附剂	化学处理、提纯、燃料、能源、传感、生物材料、污染控制、气候变化
有机物质热物性数据库	51种有机物质和1,200+二元混合物的472,000组热物性数据	提纯、精细化工及药物生产与提纯，有机材料的应用研究
高分子热力学数据库	12,000+纯高分子，8000+混合物的28种热力学性质数据，包含数据超过1,000,000个	塑料、包装、化工、涂料、薄膜、医学材料、生物材料
泡沫金属性质数据	271组泡沫金属的性质数据	特种金属材料， 航空航天材料， 导弹工业， 建筑、特种设备、人工骨骼
材料的光谱表征与显微成像数据集	金属、有机物质、液体、高聚物等的紫外、红外、拉曼、PES, Mössbauer, 核磁, 及透射电镜, 扫描隧道显微镜等材料表征方法下的特征数据信息	材料和物质表征是广泛研究领域的常用数据信息
(有机&无机) 物质档案	34,684个有机和无机物的物质档案	广泛研究领域的常用数据信息
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玻璃

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&  
新型材料

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& 泡沫金属

有机  
&  
无机化合物

高分子材料

半导体  
&  
电子材料

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化学性质



热力学性质



电磁性质



结构性质



机械性能



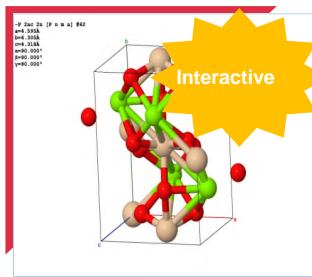
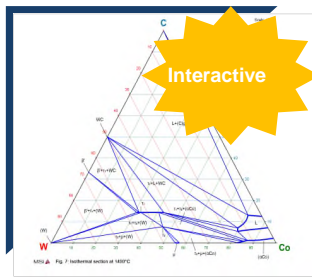
光谱学性质



原子能性质

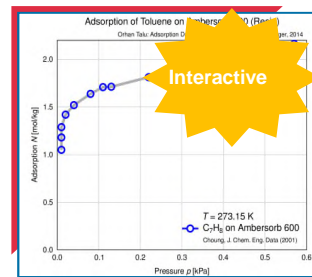
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# 数据类型：相图， 晶体结构， 数据表格， 材料性质文档， 曲线图



Calculated and Experimental data

Temperature (K)	Amorphous State		Crystalline State	
	Heat Capacity (J/mol-K)	Entropy (J/mol-K)	Heat Capacity (J/mol-K)	Entropy (J/mol-K)
1.160	0.000	10271.660	123.700	48393.270
1.200	0.000	10271.660	123.700	48296.000
1.300	0.000	10271.660	123.700	48264.120
1.400	0.000	10271.660	123.700	48272.130



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Find out a corrosion rate and/or corrosion mechanism by entering a material and environment with search for name

Material: Nickel alloy 200, Environment: Seawater, Solution: Seawater

Search results:

Material	Environment	Rate	Corrosion Mechanism
Nickel alloy 200	Seawater	A: 0.0001 mm/year	Electrochemical

1-Methyl-Pyrrolidine-2-One

Molecular Formula: C<sub>5</sub>H<sub>9</sub>N

Chemical Structure: CN1CCCC1=O

Explore this substance

- Chemical Properties
- Physical Properties
- Environmental Data
- Biological Data
- Thermodynamic Data
- Phase Diagrams
- Crystallographic Data
- Computational Chemistry
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- Regulatory Information
- References

Eu<sub>2</sub>Ga<sub>2</sub>Ge<sub>2</sub> ht charge carrier mobility

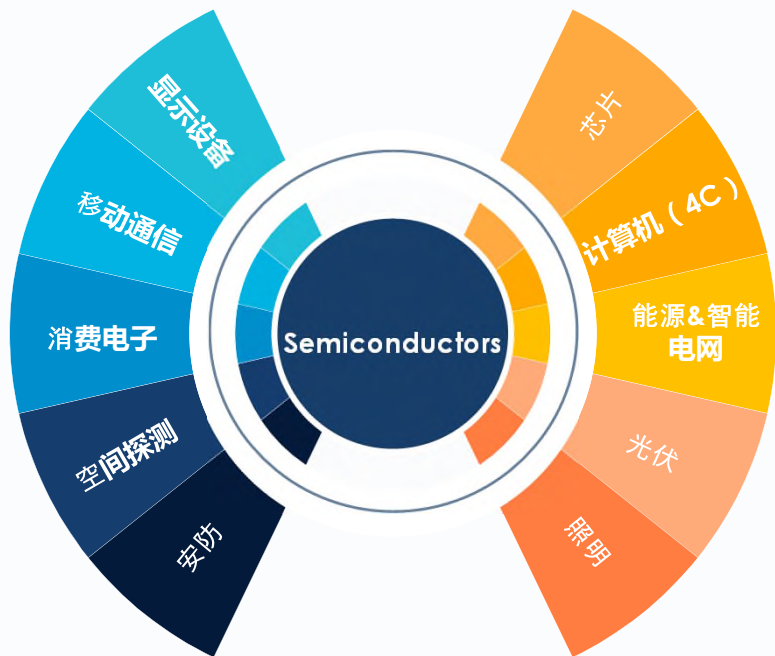
General Information

Property	Temperature	Remark	SPD	Reference	Cyclopedic Database
$\mu_{n, 1.1 \times 10^{-2} \text{ m}^2 \text{ V}^{-1} \text{ s}^{-1}}$	T < 2 K	See full mobility measurements	P10080	10267, Pachter (2015)	IC1010169
$\mu_{n, 1.5 \times 10^{-2} \text{ m}^2 \text{ V}^{-1} \text{ s}^{-1}}$	T < 300 K	See full mobility measurements	P10080	10267, Pachter (2015)	IC1010169



### 半导体

- 是现代电子学的核心，也是国家战略的核心
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- **重点研究方向“电子电气工程、通信工程、材料科学、物理、化学”都离不开对半导体这一特殊材料的研发工作**



## SpringerMaterials数据库-半导体模块

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Thank you!

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