

中国材料名师讲坛

China Distinguished Materials Scientists Forum



(第一辑)



谢建新 主编



冶金工业出版社
Metallurgical Industry Press

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2012

图书在版编目(CIP)数据

中国材料名师讲坛. 第一辑 / 谢建新主编. — 北京: 冶金工业出版社, 2012.4

ISBN 978-7-5024-5952-9

I. ①中… II. ①谢… III. ①材料科学—学术会议—文集 IV. ①TB3-53

中国版本图书馆CIP数据核字(2012)第057704号

出 版 人 曹胜利

地 址 北京北河沿大街嵩祝院北巷39号, 邮编100009

电 话 (010)64027926 电子信箱 yjcbs@cnmip.com.cn

组 稿 张 卫 责任编辑 袁建玲 美术编辑 李 新 摄 影 田 实

版式设计 李 新 彭子赫 责任校对 王永欣 责任印制 牛晓波

ISBN 978-7-5024-5952-9

文物出版社印刷厂印刷; 冶金工业出版社出版发行; 各地新华书店经销

2012年4月第1版, 2012年4月第1次印刷

210mm×285mm; 7.75印张; 245千字; 106页

60.00元

冶金工业出版社投稿电话: (010)64027932 投稿信箱: tougao@cnmip.com.cn

冶金工业出版社发行部 电话: (010)64044283 传真: (010)64027893

冶金书店 地址: 北京东四西大街46号(100010) 电话: (010)65289081(兼传真)

(本书如有印装质量问题, 本社发行部负责退换)

序

“所谓大学者，非谓有大楼之谓也，有大师之谓也。”

大学之本在于弘扬高尚品德，在于探索科学真知，在于启承人类文明，而大师则是大学之魂。为了弘扬大师的学术思想，开启学子的智慧，2003年由北京科技大学创办了“中国材料名师讲坛”。“中国材料名师讲坛”得到了国家自然科学基金委员会、科技部、教育部的大力支持，迄今已成功举办了51期。

“中国材料名师讲坛”主要聘请在国内外材料科学与工程领域取得重大成就的学术大师、知名专家学者，讲授学科前沿发展动态、本人及其课题组的代表性成果，研讨学科发展战略等。自讲坛举办以来，中国乃至世界材料界的顶级名师汇聚一堂。首次讲坛由中国国家最高科学技术奖获得者、中国科学院和中国工程院两院资深院士师昌绪先生开讲，师先生从宏观角度畅谈了其对我国材料科技中长期发展规划的思考。之后，全国政协副主席、中国工程院院长徐匡迪院士从发展的角度讲述了钢铁冶金从技艺走向工程科学的观念；美国艺术科学院院士、美国国家科学院院士、哈佛大学前化学系主任、《Nanoletter》主编Lieber教授，英国皇家科学院院士、牛津大学前材料系主任George D. Smith教授等名师从各自研究的领域展示了当今世界科技研究的最新成果。大师们渊博的知识、独到的见解、高尚的品格和强大的人格魅力给中外材料学子留下了深刻的印象。

“中国材料名师讲坛”加深了中外学者间学术思想交流，开阔了青年学子的学术视野，也成为国内外专家学者了解北京科技大学材料学科的窗口，已经被打造成为北京科技大学的品牌活动，在国内外形成了一定影响力。材料科学与工程学院将“中国材料名师讲坛”的前50讲结集成册，作为向北京科技大学甲子华诞的献礼，也让更多的人能够感受名师风采、大家风范。

感谢大师们的学术奉献，感谢国家自然科学基金委员会、科技部、教育部和协办单位的大力支持。

祝“中国材料名师讲坛”越办越好！

北京科技大学校长：

徐钊

2012年3月于北京



Foreword

The famous Chinese educator, Mr. Yiqi Mei(1889—1962) once said: “What makes a good university is its number and quality of masters, not buildings.”

The masters are the soul of universities, whose role is to promote the noble character, to discover the truth of science and to inherit the human civilization. To expand the masters' academic thoughts and to enlighten students, in 2003, USTB set up China Distinguished Materials Scientists Forum under the support of National Natural Science Foundation of China, China's Ministry of Science and Technology, Ministry of Education, and has successfully held 51 lectures.

A number of domestic and overseas masters and famous scholars of materials science and engineering have shown up at China Distinguished Materials Scientists Forum to lecture on the trends of frontiers development of this field as well as to discuss the developing strategy of materials science and engineering. Since the very beginning of the forum, the top masters of materials science have gathered at USTB. The first lecturer of the forum is the winner of the top prize of State Science and Technology Awards, Mr. Changxu Shi, the senior fellow of Chinese Academy of Science and Chinese Academy of Engineering, who spoke about his thinking of materials science and technology development in a medium-and-long-term plan of China. Mr. Kuangdi Xu, Vice Chairman of the CPPCC and President of Chinese Academy of Engineering, described the transition process of ferrous metallurgy from a technique to an engineering science. We are also honored to have Prof. Lieber, the elected fellow of American Academy of Arts and Sciences and elected member of National Academy of Sciences of America, the former head of the chemistry department of Harvard University and the chief editor of “Nano letter”, and Prof. George D. Smith, the fellow of Royal Academy of Science of British and former head of materials department of University of Oxford, to present the latest achievements of materials science research in today's world. The profound knowledge, original opinion, noble character and charming personality of these masters have left the students indelible impressions.

China Distinguished Materials Scientists Forum, which has strengthened the academic exchange between Chinese and overseas scholars and expand the young students' academic horizon, has become one of the symbolic activities of USTB and the platform for the experts all over the world to know the materials subject of USTB with a certain influence in China and across the world. Therefore the School of Materials Science and Engineering has assembled the 50 lectures of the forum to a picture album as a gift to the 60th anniversary of USTB to expand the grace of masters.

On behalf of USTB, I'd like to express my sincere thanks again to the materials masters for their academic dedication, National Natural Science Foundation of China, China's Ministry of Science and Technology, Ministry of Education, and other organizations concerned for their great support.

Best wishes for China Distinguished Materials Scientists Forum!

President of USTB: Prof. Jinwu Xu

March, 2012 Beijing

前 言

中国材料名师讲坛 (China Distinguished Materials Scientists Forum) 是北京科技大学为了加强国内外材料科技界的学术交流、培养具有国际视野和了解科技前沿的创新型人才而创立的,是为了配合学校建设“世界冶金材料教育科研中心”和“中国新型工业化教育科研中心”的重要举措之一。中国材料名师讲坛的创办得到了国家自然科学基金委员会、科技部、教育部有关部门和北京有色金属研究总院、钢铁研究总院等单位的大力支持。讲坛主要聘请在国内材料科学与工程领域取得重大成就的学术大师、著名学者,讲授学科前沿发展动态、本人及其课题组的代表性成果,研讨学科发展战略等。

中国材料名师讲坛贯彻百花齐放、百家争鸣的方针,坚持实事求是的科学态度,倡导学术民主、学术自由的风尚,为培养和造就优秀学术、技术带头人营造一个良好的学术交流氛围和学习环境;以开放的风格、轻松的气氛,以促进学术交流、学科发展为目的,吸引了国内外许多学术大师的关注,成为了材料界精英的盛会。讲坛每年举办6~8讲,每讲聘请一位名师讲授,采取以学术报告为主、交流和研讨为辅的方式,从2003年9月至今共举办51次,其中由国外学术大师主讲25次,国内学术大师主讲26次。

为庆祝北京科技大学60华诞,特将第一讲至第五十讲编辑成《中国材料名师讲坛》(第一辑)画册。画册汇集了每期讲座的主讲人简介、主要内容及精彩瞬间的照片等。我们希望以画册的形式纪念中国材料名师讲坛八年来的发展历程,向北京科技大学甲子华诞献礼。我们相信,随着国内外学术交流的不断深入和发展,中国材料名师讲坛必将成为在国际上具有重要影响的权威学术论坛,成为材料界乃至整个科学界的一朵奇葩!

衷心感谢讲坛各位名师对编辑出版本画册的理解和大力支持。由于时间仓促,编者水平有限,画册中难免有疏漏和错误,诚挚希望广大读者提出宝贵意见,以改进和完善画册内容,更好地发挥其纪念和传承中国材料名师讲坛的作用,为中国乃至世界材料科技的发展贡献微薄之力!



编 者

2012年3月

Preface

China Distinguished Materials Scientists Forum was set up to enhance the academic exchange of materials science and technology between The University of Science and Technology Beijing and the whole world, as well as to cultivate the creative talents with global outlook and the knowledge of the frontiers of science. It is one of the important steps to help USTB build “World Education and Scientific Research Center on Metallurgy and Materials Science” and “China’s Education and Scientific Research Center on New Industrialization”. Thanks to the substantial support from National Natural Science Foundation of China, China’s Ministry of Science and Technology, Ministry of Education, General Research Institute of Nonferrous Metals in Beijing, Central Iron & Steel Research Institute and other government departments and institutes, a number of domestic and overseas masters and famous scholars of materials science and engineering have shown up at China Distinguished Materials Scientists Forum to lecture on the trends of frontiers development of this field as well as to discuss the developing strategy of materials science and engineering.

China Distinguished Materials Scientists Forum is open to all schools of thoughts, sticks to the scientific attitude based on reality, advocates academic democracy and freedom in order to create a favorable atmosphere of academic exchange and learning environment helpful for cultivating the excellent academic and technology leaders. With the goal of encouraging academic exchange and development, China Distinguished Materials Scientists Forum has attracted the academic masters from the world and become the festival of elites of this field in the open-minded and relaxed atmosphere. From the very beginning of Sept, 2003 until now, 51 lectures have been delivered by 26 domestic guests and 25 foreign lecturers who mainly presented academic reports and researches occasionally at a rate of 6 to 8 lectures annually.

To celebrate the 60th anniversary of USTB, we edited this picture album of China Distinguished Materials Scientists Forum (from the 1st to the 50th), which included the introduction of the lecturers, main content and some brilliant moments of the lectures. It is our sincere hope that this picture album, which records the development process of the forum in the past 8 years, is a substantial gift dedicated to the 60th anniversary of USTB. We believe that China Distinguished Materials Scientists Forum will become an authoritatively academic forum not only in the field of materials science and technology but also in the whole scientific world.

Our heartfelt gratitude goes to the distinguished materials scientists for their understanding and support for editing and publishing this album. Their valuable advice will help us improve and refine the content of the album to commemorate the 60th anniversary of USTB, to inherit the spirit of China Distinguished Materials Scientists Forum, and ultimately to contribute to the development of materials science and technology of China and the whole world!

Editors
March, 2012

“中国材料名师讲坛”章程

第一章 总 则

第一条 为了活跃学术气氛，强化国内外材料科学与工程学术界的交流与合作，自2003年9月起在北京科技大学设立“中国材料名师讲坛”。

第二条 “中国材料名师讲坛”由北京科技大学主办，北京科技大学材料科学与工程学院承办，主要聘请国内外材料科学与工程领域取得重大成就的学术大师、知名学者讲授学科前沿发展动态、本人及其研究组的代表性成果，研讨学科发展战略等。

第三条 “中国材料名师讲坛”贯彻百花齐放，百家争鸣的方针，坚持实事求是的科学态度，倡导学术民主、学术自由的风尚，为培养和造就优秀学术、技术带头人营造一个良好的学术交流氛围和学习环境。

第二章 实施办法

第四条 “中国材料名师讲坛”平均每月举办一次，每次聘请一位名师讲授，采取以学术报告为主、交流和研讨为辅的方式。

第五条 报告人应是在材料科学与工程领域做出了重大贡献，在国内外具有重要影响的科学家和工程技术专家。

第六条 报告候选人可以以自荐或专家推荐的方式产生，自荐人或推荐人需向北京科技大学材料科学与工程学院提交《中国材料名师讲坛名师提名表》等材料，院学术委员会讨论通过后，向报告人发出正式邀请函。

第七条 主办单位将向每位报告人颁发“中国材料名师讲坛”纪念章一枚，支付酬金人民币伍千元，同时，负担报告人来校讲学的往返交通费用及讲学期间的生活费用。

第三章 附 则

第八条 为保证“中国材料名师讲坛”的有效实施，北京科技大学吸纳企业和个人的赞助，设立“中国材料名师讲坛”专项基金。

第九条 本办法从颁布之日起生效。

第十条 本办法的解释权归北京科技大学。

第十一条 本条例2003年9月制定。

Constitution of Material Scientists Forum of China

Chapter I General Principles

1. Material Scientists Forum of China was established in the September of 2003. The aim of the forum is to activate and develop the academic exchange and cooperation from home and abroad in the sphere of material science and engineering.
2. The Material Scientists Forum of China is supported by University of Science and Technology Beijing (USTB), and undertaken by School of Material Science and Engineering (SMSE) of the university. The famous scholars with great achievement in material science and engineering will be invited herein to give the speeches about developing tendency and strategy of the subject as well as the representative achievements of their own or their research groups.
3. In the Material Scientists Forum of China, academic democracy and freedom is powerfully supported. "Telling the truth" is widely applied. Various academic opinions are allowed to issue. The excellent academic and/or technical leaders are, therefore, expected to grow up in this environment.

Chapter II Execution Method

4. The Material Scientists Forum of China will be held once a month averagely. The main formation is that one famous scientist is invited each time to give an oral report. The assistant one, communication and discussion with the lecturer, will also be taken.
5. The lecturer should be domestic or oversea influential scientists / technical experts that have made great contribution in the field of material science and/or engineering.
6. The Material Scientists Forum of China can accept the candidates of the lectures recommended by himself or by other experts. The self- or other-recommended candidates should submit nomination tables of the Material Scientists Forum of China and other related materials to SMSE of USTB. The formal inviting letter will be sent to the lecturer after the admission of the academic committee of SMSE.
7. USTB will award each lecturer one commemorating badge and 5000 Yuan (RENMINBI). Also, afford the cost of living during the period of lecturing as well as to-and-fro journey fare.

Chapter III Additional Items

8. USTB can accept any contribution by enterprises and persons in order to ensure the effective execution of the Material Scientists Forum of China. The contribution will be managed as the special fund of Material Scientists Forum of China.
9. This constitution will come into effect from the day promulgation.
10. The right of explanation of this constitution belongs to USTB.
11. This constitution was constituted in the September of 2003.

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“中国材料名师讲坛”设立于2003年9月，得到了国家自然科学基金委员会、科技部、教育部的大力支持。讲坛由北京科技大学主办，北京有色金属研究总院、钢铁研究总院协办；主要聘请在国内外材料科学与工程领域取得重大成就的学术大师、知名学者讲授学科前沿发展动态、本人及其课题组的代表性成果，研讨学科发展战略等



第一讲

主讲人：师昌绪

中国科学院院士 中国工程院院士

Shi Changxu, Academician of the Chinese Academy of Sciences, and Member of Chinese Academy of Engineering

时 间：2003年11月10日

题 目：关于我国中长期材料科技发展规划的思考

On Medium and Long Term Program of Material Science and Technology Development in China

主讲人简介：

师昌绪，著名金属学及材料科学家。1980年当选为中国科学院院士。1994年当选为首批中国工程院院士，担任中国工程院副院长。1995年当选为第三世界科学院院士，同年当选为第三世界科学院院长。现为国家自然科学基金委员会研究员、特邀顾问，中国科学院金属研究所名誉所长，中国国际科技促进会会长。荣获2010年度国家最高科学技术奖。

主要内容：

讲座从中长期科技发展规划中对材料科学的定位以及导向引申出材料学科的重要性；阐述了材料生产和科学研究现状，以及我国资源匮乏、能源紧缺的问题；最后指出了未来材料科学研究与发展的走向。

其中，师昌绪院士着重强调了材料是高技术产业的先导和基础，以及中国对材料科技历来给予的高度重视。尤其是战略规划的设计，由于其在很长一段时间内影响到发展方向和支持力度，所以必须以“有所为有所不为”的思想为指导，同时结合我国现状和世界动态才能制定好全盘规划。师昌绪院士还指出，基础研究是原始创新的源泉，是成果转化的

