

# ***RESUME / BIOGRAPHY***

**Professor Can Li**

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## **I. Candidate's Research Interests and Achievements**

Prof. Can Li has been working on both fundamental and applied research in catalysis and making efforts to reveal the essential relationship between catalytic performance and catalyst structure, and try to understand catalysis at various levels including atomic, molecular as well as nanometer scales and to apply these understandings to the designs and the development of practical applications in energy (solar fuels), fine chemicals (chiral synthesis) and environmental sciences (ultra-deep desulfurization of fuels). In particular to understand the fundamental of catalysis by developing in situ spectroscopy (e.g., UV Raman, Time resolved vibrational and electronic spectroscopy) to characterize the catalyst structure, and catalytic reactions.

Can Li has been the Director of the State Key Laboratory, Dalian Institute of Chemical Physics, Chinese Academy of Sciences since 1998, and the former Chairman of the Catalysis Society of China (2005-2012), and the former President of International Association of Catalysis Societies (2008-2012), and current President of The Asia-Pacific Association of Catalysis Societies. Can Li was elected a Member of the Chinese Academy of Science in 2003, a Member of The Academy of Science for Developing Countries (TWAS) in 2005, and a Foreign Member of Academia Europea in 2008, a Fellow of the Royal Society of Chemistry in 2008.

Can Li has received numerous awards and honors for his contributions to the advancement of the catalysis sciences and technology. Among the prestigious ones include the International Catalysis Award for his outstanding contributions to catalysis in micro- and mesoporous in general, and of UV Raman identification of active sites and confinement effects in chiral synthesis in particular; National Natural Science Prize for

his contribution to the UV Resonance Raman Spectroscopy for characterizing catalysts particularly of semiconductor based photocatalysts and transition metal containing zeolites for selective oxidations; Ho Leung Ho Lee Prize (HLHL Foundation from Hong Kong) for his contribution to the development of chiral synthesis in nanoreactors by bridging the heterogeneous and homogeneous catalysis, and National Petrochemical Prize for his contribution to the development and commercialization of ultra deep desulfurization with emulsion catalysis and layered bulk catalysts in China. In the last decade, Can Li has made significant contribution to the solar fuels production via photocatalytic and photoelectrocatalytic water splitting and CO<sub>2</sub> reduction by developing new concepts in photocatalysis (such as photogenerated charge separation with phase junction, between different facets, and dual co-catalysts strategy). Can Li has ~ 600 publications, ~ 13000 citations, an H-index ~ 60, ~ 60 granted patents and over 70 plenary and keynote lectures at international conferences.

## II. Curriculum Vitae

### Personal Data:

Name	Can Li
Date of Birth	January 23, 1960
Place of Birth	Gansu Province, China
Sex	Male
Marital Status	Married with one child
Foreign Languages	English and Japanese
Nationality	Chinese
Title	Professor, PhD
Position	Director of State Key Laboratory of Catalysis Director of Dalian National Laboratory for Clean Energy
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### Education:

1986-1988	PhD., Physical/Catalysis Chemistry Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China (A jointed education program with Tokyo Institute of Technology, Japan, awarded a UNESCO research fellowship)
1983-1985	MSc, Physical/Catalysis Chemistry Dalian Institute of Chemical Physics, China
1978-80/81-83	BSc, Chemistry, Zhangye Normal College/Shanxi Normal University, China (A chemistry teacher during 1980-1981)

### Work Experiences:

2011-	Director, Dalian National Laboratory for Clean Energy
02-03/2007	Visiting Professor, the University of Queensland, Australia

- 2007-2012 Deputy Director, Dalian Institute of Chemical Physics
- 2007 Director of Joint Energy Innovation Laboratory (between BP and DICP)
- 03-04/2003 Invited Professor, Université Pierre et Marie Curie, Paris VI, France
- 01-03/2002 Visiting Professor, Lehigh University, USA
- 11-12/2000 JSPS Visiting Professor, the University of Tokyo, Waseda University  
Tokyo Institute of Technology, Hokkaido University, and Institute of  
Materials Science, Tsukuba, Japan
- 2000- Director of Joint Laboratory of France-China on Catalysis
- 01-03/1999 Visiting Professor, the University of Liverpool, UK
- 1998- Director, State Key Laboratory of Catalysis, Dalian Institute of Chemical  
Physics, China
- 1994-1996 Post-doc/Visiting Professor, Northwestern University, USA
- 1993.9- Full Professor, Dalian Institute of Chemical Physics, China
- 1990-1993 Associate Professor, Dalian Institute of Chemical Physics, China
- 10-12/1990 Visiting Scholar, Louvain-la-Neuve Catholique University, Belgium
- 1989-1990 Assistant Professor, Dalian Institute of Chemical Physics, China

### **Professional Societies and Activities:**

- 2013- President of Asian-Pacific Association of Catalysis Society
- 2008-2012 President of the International Association of Catalysis Societies
- 2008- Chairman of the Molecular Spectroscopy Society of China
- 2005-2012 Chairman of the Catalysis Society of China
- 2005-2009 Chairman of the Light Scattering Society of China
- 2004-2008 Vice President of the International Association of Catalysis Societies
- 2004- Chairman of Advisory Board of the State Key Laboratory of Oxo  
Synthesis and Selective Oxidation, Lanzhou Institute of Chemical  
Physics
- 1998-2004 Council Member of the International Association of Catalysis Societies

### **Editorial Boards of Journals:**

#### **International Journals:**

- 2012- “Energy Technology” (Editorial Board)
- 2010- “Chemical Communications” (Associate Editor)
- 2008- “Journal of Raman Spectroscopy” (Editorial Advisory Board)

- 2007- “ChemSusChem” (International Advisory Board)
- 2007- “ChemCatChem” (International Advisory Board)
- 2006- “Journal of Physical Chemistry” (International Advisory Board)
- 2005- “Chemistry: An Asian Journal” (Editorial Board)
- 2005-2008 “Physical Chemistry Chemical Physics” (Advisory Board)
- 2005- “Journal of Catalysis” (Editorial Board)
- 2004- “International Journal of Applied Chemistry” (Editorial Board)
- 2003- “Platinum Metals Review” (Editorial Board)
- 2003- “Research on Chemical Intermediates” (Editorial Board)
- 2002- “Journal of Molecular Catalysis A: Chemical” (Editorial Board)
- 2002- “Catalysis Surveys from Asia” (Editorial Board)
- 1998-2004 “Applied Catalysis A: General” (Editorial Board)

### **Domestic Journals:**

- 2005- “Chinese Journal of Fuel Chemistry” (Vice Editor-in-Chief)
- 2004- “Chinese Journal of Chemical Engineering”
- 2003- “Chinese Journal of Chemical Physics”
- 2003- “Spectroscopy and Spectroscopic Analysis” (Vice Editor-in-Chief)
- 2002-2008 “Science in China, B, Chemistry”
- 2002-2008 “Progress in Chemistry”
- 2002- “Chinese Journal of Catalysis” (Vice Editor-in-Chief)
- 2002- “Petrochemical Application and Technology”
- 2001- “Journal of Natural Gas Chemistry”
- 1999- “Chinese Journal of Catalysis”
- 1999-2006 “Chemistry in Chinese”
- 1998- “Petrochemical Technology” (Steering Committee)

### **Awards and Honors**

- 2011 National Award for Natural Sciences of China
- 2008 Elected to the Foreign Member of Academia Europaea
- 2005 Outstanding Achievement Prize of the Chinese Academy of Sciences  
(Only one in chemistry science field)
- 2005 Elected to the Member of TWAS (The Academy of Sciences for Developing Countries)
- 2005 HLHL (Ho Leung Ho Lee) Prize (Only 4 scientists in chemistry awarded in

China)

- 2005 Fellow of Royal Society of Chemistry, FRSC
- 2004 International Catalysis Award (One award is conferred every four years)
- 2003 Elected to the Academician of the Chinese Academy of Sciences
- 2003 Invited Professorship, Université Pierre et Marie Curie, Paris VI, France
- 2003 National Award for Outstanding Scientists Returned from Overseas
- 2001 Japan Science Promotion Society Visiting Professorship
- 1999 National Technology Innovation Prize of China
- 1999 National Award for Excellent Scientists in China
- 1998 National Award for Outstanding Young Scientists in China (One award is granted every three years in the chemistry field)
- 1997 Hong Kong “Qiu-Shi” Award for Outstanding Young Scientists (Five were awarded in chemistry field)
- 1996 NSF Fund for Outstanding Young Scientists of China
- 1994 National Award for Excellent Young Researchers in China
- 1993 Outstanding Young Scientist Awarded by the Chinese Academy of Sciences
- 1993 Natural Science Prize of the Chinese Academy of Sciences

### **Honorary and Guest Professorships:**

- 2014- Hong Kong Baptist University (Distinguished Professor)
- 2010- South China University of Technology (Honorary Professor)
- 2009- Sun Yat-sen University
- 2009- Herbin Institute of Technology (Honorary Professor)
- 2008- Nanjing University
- 2008- Hunan University
- 2007- The University of Queensland, Australia (Honorary Professor)
- 2006- Tsinghua University
- 2006- Beijing Institute of Technology (Beijing University of Science and Technology)
- 2005- Northwestern Normal University (Honorary Professor)
- 2005- Shanxi University
- 2005- Peking University
- 2005- Inner Monguli University
- 2004- Institute of Chemistry, Chinese Academy of Sciences
- 2004- Hexi College (Honorary Professor)



2004-	Liaoning Normal University
2002-	Yantai University
2002-	Zhejiang Normal University
2000-	Northeastern Normal University (Honorary Professor)
2001-	University of Science and Technology of China
2000-	Dalian University of Technology
1999-	Guizhou University
1999-	Shanxi Normal University
1998-	Lanzhou University

### **Keynotes and Plenary Lectures at International Conferences:**

- 1 “Artificial Photosynthesis for Solar Fuel Production”, *Theo Murphy International Scientific Meeting*, Milton Keynes, UK, July 8-10, 2014 (Invited Lecture)
- 2 “Fundamental Understanding of Photocatalysis and Photoelectrocatalysis for Solar Fuel Production”, *The 3<sup>rd</sup> International Workshop on Solar Energy for Sustainability*, Singapore, June 11-14, 2014 (Invited Lecture)
- 3 “Fundamental Understanding of Photocatalysis and Photoelectrocatalysis for Solar Fuel Production”, *The 7<sup>th</sup> Tokyo Conference on Advanced Catalytic Science and Technology (TOCAT7)*, Kyoto, Japan, June 1-6, 2014 (Plenary Lecture)
- 4 “Photocatalytic Evolution of Oxygen and Hydrogen on Cocatalysts”, *2014 Gordon Research Conference on Renewable Energy: Solar Fuels*, Ventura California, USA, January 19-24, 2014 (Discussion Leader)
- 5 “Fundamental Understanding of Photocatalysis: Roles of Cocatalysts and Junctions”, *The 6<sup>th</sup> Asia-Pacific Congress on Catalysis (APCAT-6)*, Taipei, October 13-17, 2013 (Keynote)
- 6 “Photocatalytic Evolution of Oxygen and Hydrogen on Cocatalysts”, *2013 Gordon Research Conference on Chemical Reactions at Surfaces*, Les Diablerets, Switzerland, April 28-May 3, 2013 (Invited Lecture)
- 7 “Photocatalytic hydrogen production by utilizing solar energy roles of cocatalysts in photocatalysis”, *The 245<sup>th</sup> ACS National Meeting & Exposition*, New Orleans, Louisiana, USA, April 7-11, 2013 (Keynote)
- 8 “The roles of cocatalyst and junctions in photocatalytic hydrogen production utilizing solar energy”, *The 15<sup>th</sup> International Congress on Catalysis*, Germany,

July 1-6, 2012 (Keynote)

- 9 “Photocatalytic Hydrogen Production Utilizing Solar Energy”, *International Conference on Hydrogen Production 2012*, Korea, June 24-27, 2012 (Keynote)
- 10 “Understanding the Roles of Co-Catalysts and Junctions in Photocatalytic Hydrogen Production Utilizing Solar Energy”, *2012 Gordon Research Conference on Renewable Energy: Solar Fuels*, Lucca, Italy, May 13-18, 2012 (Invited Lecture)
- 11 “UV Raman Spectroscopic Characterization of Catalytic Materials for Energy and Environment”, *22<sup>nd</sup> Canadian Symposium on Catalysis*, Canada, May 13-16, 2012 (Plenary lecture)
- 12 “Photocatalytic Hydrogen Production by Utilizing Solar Energy Roles of Cocatalysts in Photocatalysis”, *Materials Research Society (MRS) 2012 spring meeting*, San Francisco, CA, April 9-13, 2012 (Invited Lecture)
- 13 “Photocatalytic hydrogen production by utilizing solar energy roles of cocatalysts in photocatalysis”, *The 243<sup>rd</sup> ACS National Meeting & Exposition*, San Diego, California, March 25-29, 2012 (Invited Lecture)
- 14 “Homogeneous Catalysis in Heterogeneous Nanoreactors”, *The 5<sup>th</sup> International Symposium of Hokkaido University Global COE Program*, Sapporo, Japan, February 21-22, 2012 (Keynote)
- 15 “Photocatalytic Hydrogen Production Utilizing Solar Energy”, *The 4<sup>th</sup> Catalysis Society Symposium of Signapore*, Signapore, June 19-20, 2011(Plenary Lecture)
- 16 “Rational Designing and Preparation of Photocatalytic Materials for Solar Fuel Production”, *The International Conference on Clean Energy Science*, Dalian, China, April 10-13, 2011 (Plenary Lecture).
- 17 “The important roles of chemistry and chemical engineering in solar energy utilizations”, *The 21<sup>st</sup> International Symposium on Chemical Reaction Engineering*, Philadelphia, PA, USA, Jun 13-16, 2010 (Plenary Lecture)
- 18 “Roles of co-catalysts and surface junctions played in photocatalytic hydrogen production”, *The workshop “Co-catalysts in Photochemical Fuel Production”*, Lyngby, Denmark, May 17-18, 2010 (Invited Lecture)
- 19 “Photocatalytic hydrogen production on semiconductor-based catalysts: Roles of co-catalysts and surface junctions”, *The fourth “IDECAT Conference on Catalysis”*, Porquerolles, France, May 12-16, 2010 (Invited Lecture)
- 20 “UV Raman spectroscopic characterization of catalytic materials”, *The ACS 239<sup>th</sup> National Meeting, San Francisco*, USA, March 21-25, 2010 (Invited Lecture)

- 21 “The vital role of catalysis played in developing clean and renewable energy”, *Hokkaido University CRC International Symposium on “Innovation Driven by Catalysis-Past, Present and Future”-Dedicated to the 20th Anniversary of CRC*, Sapporo, Japan, December 7-9, 2009 (Invited Lecture)
- 22 “The roles of surface junctions and co-catalysts played in photocatalytic hydrogen production”, *Symposium “Catalytic Materials for Energy, Green Processes and Nanotechnology (Symposium Y)” in the MRS 2009 Fall Meeting*, Boston, USA, November 29-December 4, 2009 (Invited Lecture)
- 23 “The important roles of chemistry and chemical engineering in solar energy utilizations”, *The 5<sup>th</sup> Sino-US Joint Conference of Chemical Engineering*, Beijing, China, October 13-16, 2009 (Invited Lecture)
- 24 “Using the sunlight to address the energy issues-sunlight to power the world”, *First Chemical Sciences and Society Symposium*, Kloster Seeon, Germany, July 22-26, 2009 (Invited Lecture)
- 25 “The role of co-catalysts and surface junctions played in photocatalytic hydrogen production”, *Nanostructured Catalysts Symposium*, Seoul, Korea, October 21-23, 2009 (Invited Lecture)
- 26 “UV Raman spectroscopic studies on surface phase transformation and photocatalytic performance of TiO<sub>2</sub>”, *21<sup>st</sup> NAM*, San Francisco, USA, June 7-12, 2009 (Invited Lecture)
- 27 “Fundamental understanding of photocatalytic hydrogen production”, *International Symposium on Solar Cells and Solar Fuels*, Dalian, China, December 10-12, 2008 (Keynote Lecture)
- 28 “Ultra-deep desulfurization of fuels using emulsion catalysis”, *The 5<sup>th</sup> International Conference on Environmental Catalysis*, Belfast, UK, August 31-September 3, 2008 (Plenary Lecture)
- 29 “Photocatalytic hydrogen production utilizing solar energy”, *International Hyforum*, Changsha, China, August 16-19, 2008 (Invited Lecture)
- 30 “Chiral catalysis on surfaces, in nanoreactors and with emulsions”, *The 14<sup>th</sup> International Congress on Catalysis*, Seoul, Korea, July 13-18, 2008 (Invited Lecture)
- 31 “Emulsion catalysis for ultra-deep desulfurization and chiral synthesis”, *The Post-Conference of the 14<sup>th</sup> ICC, Catalysis for Clean Fuels*, Dalian, China, July 21-24, 2008 (Plenary Lecture)
- 32 “Fundamental understanding of photocatalytic hydrogen production”, *Post-Conference of the 14<sup>th</sup> ICC, Catalysis for Hydrogen Energy Production*

- and Utilization*, Gyenogju, Korea, July 19-23, 2008 (Keynote Lecture)
- 33 “Photocatalytic hydrogen production utilizing solar energy”, *Raw Materials for the Future: from Black to Green Gold?*, Lyon, France, December 6-7, 2007 (Invited Lecture)
- 34 “Surface phase transformation of TiO<sub>2</sub> and its photocatalytic significance studied by UV Raman spectroscopy”, *International Conference Catalysis: Fundamentals and Application*, Novosibirsk, Russia, July 4-8, 2007 (Keynote Lecture)
- 35 “UV Raman spectroscopic studies on transition metal-containing microporous and mesoporous materials: Active sites and synthesis mechanism”, *15<sup>th</sup> International Zeolite Conference*, Beijing, China, August 12-17, 2007 (Invited Lecture)
- 36 “Catalysis on surface”, *Learning Organic Synthesis Tremendously*, Namur, Belgium, May 21-23, 2007 (Invited Lecture)
- 37 “UV Raman spectroscopic studies on catalytic materials: Active sites and active phases”, *2007 Meeting of the DOE/BES Catalysis and Chemical Transformations Program*, Wintergreen, USA, May 23-26, 2007 (Invited Lecture)
- 38 “Emulsion catalysis: An environmentally benign and green chemistry approach”, *The 4<sup>th</sup> Asia-Pacific Congress on Catalysis (APCAT 4)*, Singapore, December 6-8, 2006 (Plenary Lecture)
- 39 “UV Raman spectroscopic study on phase transformation of metal oxides”, *The 20<sup>th</sup> International Conference on Raman Spectroscopy*, Yokohama, Japan, August 2006 (Keynote Lecture)
- 40 “Hydrogen production by utilizing solar energy”, *Emerging Energy Summit*, Santa Barbara, USA, March 2006 (Invited Lecture)
- 41 “Phase transformation at surface region and its catalytic significance studied by UV Raman spectroscopy”, *Annual Meeting of the Pacific Coast Catalysis Society*, Berkeley, USA, March 11, 2005 (Invited Lecture)
- 42 “Structure of active site and  $\alpha$ -Oxygen formation on Fe/ZSM-5”, *American Chemical Society Meeting*, San Diego, USA, 2005, (Invited Lecture)
- 43 “Chiral synthesis in the pores of mesoporous materials”, *ICMAT & IUMRS-ICAM*, Singapore, July 3-8, 2005 (Invited Lecture)
- 44 “Design, synthesis and catalysis of recoverable catalysts assembled in emulsion and its application in deep desulfurization of fuel oil”, *Seventh European Congress on Catalysis, Europacat-7*, Sofia, Bulgaria, August 28, 2005 (Invited Lecture)

- Lecture)
- 45 “UV Raman spectroscopy and its applications in catalysis and materials science”, *The 40<sup>th</sup> IUPAC Congress*, Beijing, China, August 14-19, 2005 (Invited Lecture)
  - 46 “Transition metal nitrides, carbides and phosphides: Possible catalysts for hydrodesulfurizations”, *The 2005 International Chemical Congress of Pacific Basin Societies (Pacifichem)*, Hawaii, USA, 2005 (Invited Lecture)
  - 47 “UV resonance Raman spectroscopic characterization of transition metal ions/oxides incorporated in the nanoporous materials”, *The 2005 International Chemical Congress of Pacific Basin Societies (Pacifichem)*, Hawaii, USA, December 15-20, 2005 (Invited Lecture)
  - 48 “Photocatalytic production of hydrogen from biomass reforming”, *The 2005 International Chemical Congress of Pacific Basin Societies (Pacifichem)*, Hawaii, USA, December 15-20, 2005 (Invited Lecture)
  - 49 “Catalysis in micro- and meso-Pores: UV Raman identification of active sites and confinement effects in chiral synthesis”, *The 13<sup>th</sup> International Congress on Catalysis*, Paris, France, June 11-16, 2004 (Plenary Lecture)
  - 50 “Heterogeneous catalysis for chiral synthesis”, *The 2<sup>nd</sup> International Conference on Catalysis and Fine Chemicals*, Hong Kong, China, December 12-14, 2004, (Plenary Lecture)
  - 51 “Frontiers of heterogeneous catalysis in the early 21<sup>st</sup> century”, *The 12<sup>th</sup> National Congress on Catalysis*, Beijing, China, December 2004 (Plenary Lecture)
  - 52 “Chiral synthesis in mesopores of heterogeneous catalysts”, *International Symposium on Chemicals and Pharmaceuticals*, Guangzhou, China, December 16-18, 2004 (Plenary Lecture)
  - 53 “Applications of modern spectroscopy in chemistry and biology”, *National Conference for Celebrating the 10<sup>th</sup> Anniversary of Outstanding Young Scientist Fund*, Beijing, China, September, 2004 (Invited Lecture)
  - 54 “Photocatalysis for Hydrogen Production” *Gordon Research Conference*, New Hampshire, USA, June 27-July 2, 2004, (Invited Lecture)
  - 55 “Highly isolated transition metal ions in zeolites characterized by UV resonance Raman spectroscopy”, *The 13<sup>th</sup> National Conference on Light Scattering*, Dalian, China, October, 2003 (Invited Lecture)
  - 56 “Chiral synthesis on heterogeneous catalysts”, *The 9<sup>th</sup> National Conference on Homogeneous Catalysis*, Dalian, China, October, 2003 (Plenary Lecture)

- 57 “Chirality on surface and in pore, and heterogeneous chiral catalysis”, *Annual Symposium on Physical Chemistry*, Changchun, China, December, 2003 (Invited Lecture)
- 58 “Advances in catalyst characterization using UV Raman spectroscopy”, *The 4<sup>th</sup> Tokyo Advanced Catalytic Science and Technology (TOCAT 4)*, Tokyo, Japan, July14-19, 2002 (Keynote Lecture)
- 59 “Asymmetric catalysis on chirally modified heterogeneous catalysts”, *The 10<sup>th</sup> National Conference on Catalysis*, Hangzhou, China, October, 2002 (Keynote Lecture)
- 60 “Progress on UV Raman spectroscopy”, *Chemistry Department, Northwestern University*, USA, December, 2002 (Colloquium Lecture)
- 61 “Epoxidation of olefins on the catalysts synthesized by ion beam implantation and chemical grafting”, *International Workshop on Catalysis for Young Scientists*, Beijing, China, September, 2001 (Keynote Lecture)
- 62 “Catalytic materials and frontier in catalysis”, *The 4<sup>th</sup> USA-China Conference on Frontier Sciences*, Beijing, China, September, 2001 (Plenary Lecture)
- 63 “Advances in catalyst characterization using UV Raman spectroscopy”, *Annual Conference of Japanese Society of Catalysis*, Tokyo, Japan, December, 2001 (Invited Lecture)
- 64 “Application of UV resonance Raman spectroscopy in catalysis and materials science”, *The 17<sup>th</sup> International Conference on Raman Spectroscopy*, Beijing, China, August, 2000 (Keynote Lecture)
- 65 “UV Raman spectroscopy of catalysts and other solid surface”, *International Symposium on Surface Raman Spectroscopy*, Xiamen, China, August, 2000 (Invited Lecture)
- 66 “Highly isolated and dispersed transition metal ions and oxides studied by UV resonance Raman spectroscopy”, *International Conference on Colloid and Surface Science*, Tokyo, Japan, November, 2000 (Keynote Lecture)
- 67 “Transition metal nitrides catalysts, preparation, characterization and catalysis” *International Symposium on Nanostructured Materials and Advanced Functions*, Sapporo, Japan, November, 2000 (Invited Lecture)
- 68 “Catalytic oxidation destruction of chlorinated aromatic pollutants”, *Waseda University, School of Science & Engineering*, Tokyo, Japan, November, 2000 (Colloquium Lecture)
- 69 “Application of UV Raman spectroscopy in catalysis”, *Leverhulme Center for Innovative Catalysis, The University of Liverpool*, Liverpool, UK, January, 1999

(Colloquium Lecture)

- 70 “Applications of Raman spectroscopy in surface chemistry”, *Conference of American Vacuum Society*, Chicago, USA, June, 1996 (Invited Lecture)
- 71 “UV Raman spectroscopy applied in chemistry and materials science”, Lawrence Laboratory, University of California at Berkeley, June, 1996 (Colloquium Lecture)
- 72 “A new technique for catalyst characterization: UV Raman spectroscopy”, *Chicago Catalysis Club*, Argonne National Laboratory, USA, May, 1995 (Invited Lecture)

### III. List of Publications

#### International Journals

1. Achieving solar overall water splitting with hybrid photosystems of photosystem II and artificial photocatalysts, Wangyin Wang, Jun Chen\*, **Can Li\*** & Wenming Tian, *Nature Communications*, **2014**, 5, 4647.
2. High efficiency organic/a-Si hybrid tandem solar cells with complementary light absorption, Wei Qin, Wei Yu, Wei Zi, Xiang Liu, Tao Yuan, Dong Yang, Shubo Wang, Guoli Tu, Jian Zhang\*, Shengzhong Frank Liu\* and **Can Li\***, *Journal of Materials Chemistry A*, **2014**, DOI: 10.1039/C4TA02690J.
3. Selective production of hydrogen peroxide and oxidation of hydrogen sulfide in an unbiased solar photoelectrochemical cell, Xu Zong, Hongjun Chen, Brian Seger, Thomas Pedersen, Matthew S. Dargusch, Eric W. McFarland, **Can Li\***, and Lianzhou Wang\*, *Energy & Environmental Science*, **2014**, DOI: 10.1039/C4EE01503G.
4. Cl-making overall water splitting possible on TiO<sub>2</sub>-based photocatalysts. Lei Huang, Rengui Li, Ruifeng Chong, Gang Liu, Jingfeng Han and **Can Li\***, *Catalysis Science & Technology*, **2014**, 4, 2913-2918.
5. Photoelectrochemical Properties of CuCrO<sub>2</sub>: Characterization of Light Absorption and Photocatalytic H<sub>2</sub> Production Performance, Yi Ma, Xin Zhou, Quanbao Ma, Anton Litke, Peng Liu, Yi Zhang, **Can Li**, Emiel J. M. Hensen, *Catalysis Letters*, **2014**, 144 (9), 1487-1493.
6. Synergetic effect of dual cocatalysts in photocatalytic H<sub>2</sub> production on Pd–IrOx/TiO<sub>2</sub>: a new insight into dual cocatalyst location, Yi Ma, Ruifeng Chong, Fuxiang Zhang, Qian Xu, Shuai Shen, Hongxian Han and **Can Li\***, *Physical Chemistry Chemical Physics*, **2014**, 16 (33), 17734-17742.
7. A new multi-metallic bulk catalyst with high hydrodesulfurization activity of 4,6-DMDBT prepared using layered hydroxide salts as structural templates, Yandie Chen, Lu Wang, Yuliang Zhang, Tiefeng Liu, Xinyi Liu, Zongxuan Jiang\* and **Can Li\***, *Applied Catalysis A: General*, **2014**, 474: 69-77.
8. Construction of anti-1, 2-Diols Bearing Chiral Tertiary Alcohol Moiety Using Free Hydroxyacetone as Aldol Donor by Imidazole-based Prolineamide Catalyst, Wengang Guo, Jianwei Wei, Yan Liu, **Can Li\***, *Tetrahedron*, **2014**, 70, 6561-6568.
9. Podlike N-Doped Carbon Nanotubes Encapsulating FeNi Alloy Nanoparticles: High-Performance Counter Electrode Materials for Dye-Sensitized Solar Cells, Xiaojia Zheng, Jiao Deng, Nan Wang, Dehui Deng, Wen-Hua Zhang, Xinhe Bao



and **Can Li**, *Angewandte Chemie International Edition*, **2014**, 53, 7023 -7027.

10. An Integrated Photoelectrochemical-Chemical Loop for Solar-Driven Overall Splitting of Hydrogen Sulfide, Xu Zong, Jingfeng Han, Brian Seger, Hongjun Chen, Gaoqing (Max) Lu, **Can Li\***, and Lianzhou Wang\*, *Angewandte Chemie International Edition*, **2014**, 53 (17), 4399-4403.
11. Solar-to-hydrogen Efficiency Exceeding 2.5% Achieved for Overall Water Splitting with All Earth-abundant Dual-photoelectrode, Chunmei Ding, Wei Qin, Nan Wang, Guiji Liu, Zhiliang Wang, Pengli Yan, Jingying Shi\* and **Can Li\***, *Physical Chemistry Chemical Physics*, **2014**, 16 (29), 15608-15614.
12. Facile synthesis of Chiral Spirooxindole-based Isotetronic Acids and 5-1H-pyrrol-2-ones via Cascade Reactions with Bifunctional Organocatalysts, Wengang Guo, Xu Wang, Boyu Zhang, Shuai Shen, Xin Zhou, Peng Wang, Yan Liu\*, **Can Li\***, *Chemistry - A European Journal*, **2014**, 20, 8545-8550.
13. A Tantalum Nitride Photoanode Modified with a Hole-Storage Layer for Highly Stable Solar Water Splitting, Guiji Liu, Jingying Shi, Fuxiang Zhang, Zheng Chen, Jingfeng Han, Chunmei Ding, Shanshan Chen, Zhiliang Wang, Hongxian Han and **Can Li\***, *Angewandte Chemie International Edition*, **2014**, 53, 1-6.
14. Selective conversion of aqueous glucose to value-added sugar aldose on TiO<sub>2</sub>-based photocatalysts, Ruifeng Chong, Jun Li, Yi Ma, Bao Zhang, Hongxian Han, **Can Li\***, *Journal of Catalysis*, **2014**, 314, 101-108.
15. DFT Simulations of Water Adsorption and Activation on Low-Index-Ga<sub>2</sub>O<sub>3</sub> Surfaces, Xin Zhou, Emiel J. M. Hensen, Rutger A. van Santen\*, and **Can Li\***, *Chemistry - A European Journal*, **2014**, 20 (23), 6915-6926.
16. Asymmetric hydrogenation by RuCl<sub>2</sub>(R-Binap)(dmf)<sub>n</sub> encapsulated in silica-based nanoreactors, Juan Peng, Xuefeng Wang, Xiaoming Zhang, Shiyang Bai, Yaopeng Zhao, Yang Qihua and **Can Li\***, *Catalysis Science & Technology*, **2014**, in press.
17. Deep ultraviolet Raman spectrograph with the laser excitation line down to 177.3 nm and its application, Shaoqing Jin, Fengtao Fan, Meiling Guo, Ying Zhang, Zhaochi Feng\*, and **Can Li\***, *Review of Scientific Instruments*, **2014**, 85 (4), 046105.
18. Controlled growth of semiconductor nanofilms within TiO<sub>2</sub> nanotubes for nanofilm sensitized solar cells, Xiaojia Zheng, Dongqi Yu, Feng-Qiang Xiong, Mingrun Li, Zhou Yang, Jian Zhu, Wen-Hua Zhang\* and **Can Li\***, *Chemical Communication*, **2014**, 50, 4364-4367.
19. A Non-fullerene Acceptor for Solution-Processed Small Molecule Solar Cells with a High Open-Circuit Voltage of 1.24V, Lingcheng Chen, Linqun Huang,

- Dong Yang, Shuying Ma, Xin Zhou, Jian Zhang\*, Guoli Tu\* and **Can Li\***, *Journal of Materials Chemistry A*, **2014**,2, 2657-2662.
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3. Catalysis in porous-material-base nanoreactors: a bridge between homogeneous and heterogeneous catalysis, Qihua Yang and **Can Li**, Chapter 10 in book “Bridging Heterogeneous and Homogenous Catalysis”, Editors: **Can Li** and Yan Liu, *Wiley-VCH*, **2014**.
4. Hybrid artificial photosynthetic systems comprising semiconductors as light harvesters and biomimetic complexes as molecular cocatalysts, Fuyu Wen and **Can Li\***, *Accounts of Chemical Research*, **2013**, 44 (11), 2355-2364.
5. Roles of Cocatalysts in Photocatalysis and Photoelectrocatalysis, Jinhui Yang, Donge Wang, Hongxian Han, and **Can Li\***, *Accounts of Chemical Research*, **2013**, 46 (8), 1900-1909.
6. Raman and UV-Raman Spectroscopies, Fengtao Fan, Zhaochi Feng, and **Can Li**, Chapter 2 in book “Characterization of Solid Materials and Heterogeneous Catalysts: From Structure to Surface Reactivity, 2 Volume Set”, Editors: Michel Che, Jacques C. Viedrine, Wiley, **2012**.
7. The 6<sup>th</sup> International Conference on Environmental Catalysis (6th ICEC) Beijing, China, September 12-15, 2010, Edited by **Can Li** and Hong He, *Catalysis Today*, **2011**, Volume 175, Issue 1, Pages 1-630.
8. UV Raman spectroscopic study on the synthesis mechanism and assembly of molecular sieves, Fengtao Fan, Zhaochi Feng and **Can Li\***. *Chemical Society Reviews*, **2010**, 39: 4794-4801.
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13. Asymmetric catalysis with metal complexes in nanoreactors, Qihua Yang, Difei Han, Hengquan Yang and **Can Li\***, *Chemistry-An Asian Journal*, **2008**, 3: 1214-1229. (Invited Focus Review for Professor Ryoji Noyori's 70th Birthday)
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15. A selection from the presentations of the 3<sup>rd</sup> Asia-Pacific Congress on Catalysis, Editors: **Can Li**, Wenjie Shen, K. Domen, D. Trimm, *Catalysis Today* Vol. 93-95, **2004**.
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17. Characterization of catalysts by Raman spectroscopy, **Can Li\*** and Meijun Li, in Characterization of Solid Catalysts (Editor, Qin Xin), Chinese Science Press, Beijing, **2004**, pp 386-432.
18. Identifying the isolated transition metal ions/oxides in molecular sieves and on oxide supports by UV resonance Raman spectroscopy, **Can Li**, *Journal of Catalysis*, **2003**, 216: 203-212. (Invited paper for 40<sup>th</sup> Commemorative Issue)
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20. Spectroscopic studies of molybdenum nitride catalysts: Active sites and surface reactions, Zili Wu, Shuwu Yang, Qin Xin and **Can Li\***, *Catalysis Surveys in Asia*, **2003**, 7: 103.
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22. Progress on enantioselective Hydrogenation on Heterogeneous Catalysts, Xiaohong Li, **Can Li\***, *Progress in Chemistry*, **2003**, 15: 204-247.



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27. Application of laser Raman spectroscopy in heterogeneous catalysis, Part.-2, **Can Li** and Qin Xin, Chemistry and Technology of Petroleum, **1991**, 12: 870.

## VI. List of Selected Exemplary Publications

### A UV Raman Spectroscopic Identification of active sites in Zeolites and Zeolite Synthesis

- A-1 UV resonance Raman spectroscopic identification of titanium atoms in the framework of TS-1 zeolite, **Can Li\***, Guang Xiong, Qin Xin, Jianke Liu, Pinliang Ying, Zhaochi Feng, Jian Li, Wubin Yang, Yongzhong Yang, Guiru Wang, Xiyao Liu, Min Lin, Xieqing Wang and Enze Min, *Angewandte Chemie International Edition*, **1999**, 38: 2220-2222. (*citations: 127*)
- A-2 Characterization of iron atoms in the framework MFI-type zeolites by UV resonance Raman spectroscopy, Yi Yu, Guang Xiong, **Can Li** and Fengshou Xiao\*, *Journal of Catalysis*, **2000**, 194: 487-490. (*citations: 36*)
- A-3 Identifying the isolated transition metal ions/oxides in molecular sieves and on oxide supports by UV resonance Raman spectroscopy, **Can Li\***, *Journal of Catalysis*, **2003**, 216: 203-212. (Invited paper for 40<sup>th</sup> Commemorative Issue) (*citations: 85*)
- A-4 Framework Fe ions in Fe-ZSM-5 zeolite studied by UV resonance Raman spectroscopy and density functional theory calculations, Keju Sun, Fengtao Fan, Haiyan Xia, Zhaochi Feng, Weixue Li and **Can Li\***, *Journal of Physical Chemistry C*, **2008**, 112: 16036-16041. (*citations: 21*)
- A-5 In situ UV Raman spectroscopic study on the synthesis mechanism of AlPO-5, Fengtao Fan, Zhaochi Feng, Keju Sun, Meiling Guo, Qiang Guo, Yu Song, Weixue Li and **Can Li\***, *Angewandte Chemie International Edition*, **2009**, 48, 8743-8747. (*citations: 25*)
- A-6 UV Raman spectroscopic studies on active sites and synthesis mechanisms of transition metal-containing microporous and mesoporous materials, Fengtao Fan, Zhaochi Feng and **Can Li\***, *Accounts of Chemical Research*, **2010**, 43: 378-387. (*citations: 33*)
- A-7 UV Raman spectroscopic study on the synthesis mechanism and assembly of molecular sieves, Fengtao Fan, Zhaochi Feng and **Can Li\***. *Chemical Society Reviews*, **2010**, 39: 4794-4801. (*citations: 18*)
- A-8 A Thorough Investigation on the Active Titanium Species in TS-1 Zeolite by In Situ UV Resonance Raman Spectroscopy, Qiang Guo, Keju Sun, Zhaochi Feng, Guanna Li, Meiling Guo, Fengtao Fan\*, and **Can Li\***, *Chemistry-A European Journal*, **2012**, 18: 13854-13860. (*citations: 10*)

### B UV Raman Spectroscopic Characterization of Photocatalysts (phase junction)

- B-1 Phase transformation in the surface region of zirconia detected by UV Raman spectroscopy, Meijun Li, Zhaochi Feng, Guang Xiong, Pinliang Ying, Qin Xin, **Can Li\***, *Journal of Physical Chemistry B*, **2001**, 105: 8107-8111. (*citations: 127*)
- B-2 UV Raman spectroscopic study on TiO<sub>2</sub>. I. Phase transformation at the surface and in the bulk, Jing Zhang, Meijun Li, Zhaochi Feng, Jun Chen and **Can Li\***, *Journal of Physical Chemistry B*, **2006**, 110: 927-935. (*citations: 312*)
- B-3 Surface phases of TiO<sub>2</sub> nanoparticles studied by UV Raman spectroscopy and FT-IR spectroscopy, Weiguang Su, Jing Zhang, Zhaochi Feng, Tao Chen, Pinliang Ying and **Can Li\***, *Journal of Physical Chemistry C*, **2008**, 112: 7710-7716. (*citations: 54*)
- B-4 Importance of the relationship between surface phases and photocatalytic activity of TiO<sub>2</sub>, Jing Zhang, Qian Xu, Zhaochi Feng, Meijun Li and **Can Li\***, *Angewandte Chemie International Edition*, **2008**, 47: 1766-1769. (*citations: 343*)
- B-5 Enhancement of photocatalytic water oxidation activity on IrO<sub>x</sub>-ZnO/Zn<sub>2-x</sub>GeO<sub>4-x-3y</sub>N<sub>2y</sub> catalyst with the solid solution phase junction, Baojun Ma, Jinhui Yang, Hongxian Han, Jiantao Wang, Xiaohong Zhang and **Can Li\***, *Journal of Physical Chemistry C*, **2010**, 114: 12818-12822. (*citations: 20*)
- B-6 Photocatalytic Overall Water Splitting Promoted with  $\alpha$ - $\beta$  Phase Junction on Ga<sub>2</sub>O<sub>3</sub>, Xiang Wang, Qian Xu, Mingrun Li, Shuai Shen, Xiuli Wang, Yaochuan Wang, Zhaochi Feng, Jingying Shi, Hongxian Han and **Can Li\***, *Angewandte Chemie International Edition*, **2012**, 51, 13089-13092. (*citations: 41*)

## C Catalytic Reactions in Nanoreactors

- C-1 Asymmetric epoxidation of allyl alcohol on organic-inorganic hybrid chiral catalysts grafted onto the surface of silica and in the mesopores of MCM-41, Song Xiang, Yiliang Zhang, Qin Xin and **Can Li\***, *Angewandte Chemie International Edition*, **2002**, 41: 821-824. (*citations: 72*)
- C-2 Enhanced cooperative activation effect in the hydrolytic kinetic resolution of epoxides on [Co(salen)] catalysts confined in nanocages, Hengquan Yang, Lei Zhang, Lin Zhong, Qihua Yang\* and **Can Li\***, *Angewandte Chemie International Edition*, **2007**, 46: 6861-6865. (*citations: 98*)
- C-3 Mesoporous organic-inorganic hybrid materials built using polyhedral oligomeric silsesquioxane blocks, Lei Zhang, Hendrikus C. L. Abbenhuis, Qihua Yang\*, Yimeng Wang, Pieter C. M. Magusin, Brahim Mezari,

- Rutger A. van Santen\* and **Can Li\***, *Angewandte Chemie International Edition*, **2007**, 46: 5003-5006. (*citations: 56*)
- C-4 Asymmetric ring-opening of epoxides on chiral Co(Salen) catalyst synthesized in SBA-16 through the “ship in a bottle” strategy, Hengquan Yang, Lei Zhang, Weiguang Su, Qihua Yang\* and **Can Li\***, *Journal of Catalysis*, **2007**, 248: 204-212. (*citations: 51*)
- C-5 Enhancement of the performance of a platinum nanocatalyst confined within carbon nanotubes for asymmetric hydrogenation, Zhijian Chen, Zaihong Guan, Mingrun Li, Qihua Yang and **Can Li\***, *Angewandte Chemie International Edition*, **2011**, 50: 4913-4917. (*citations: 45*)
- C-6 Oxygen evolution from water oxidation on molecular catalysts confined in the nanocages of mesoporous silicas, Bo Li, Fei Li, Shiyang Bai, Zhijun Wang, Licheng Sun, Qihua Yang\* and **Can Li\***, *Energy & Environmental Science*, **2012**, 5: 8229-8233. (*citations: 9*)
- C-7 Hydration of Epoxides on [Co<sup>III</sup>(salen)] Encapsulated in Silica-Based Nanoreactors, Bo Li, Shiyang Bai, Xuefeng Wang, Mingmei Zhong, Qihua Yang\*, **Can Li\***, *Angewandte Chemie International Edition*, **2012**, 51, 11517-11521. (*citations: 9*)

## D Co-catalysts in Photocatalysis

- D-1 Enhancement of photocatalytic H<sub>2</sub> evolution on CdS by loading MoS<sub>2</sub> as cocatalyst under visible light irradiation, Xu Zong, Hongjian Yan, Guopeng Wu, Guijun Ma, Fuyu Wen, Lu Wang, and **Can Li\***, *Journal of the American Chemical Society*, **2008**, 130: 7176-7177. (*citations: 374*)
- D-2 The synergistic effects of two co-catalysts on Zn<sub>2</sub>GeO<sub>4</sub> on photocatalytic water splitting, Baojun Ma, Fuyu Wen, Hongfu Jiang, Jinhui Yang, Pinliang Ying and **Can Li\***, *Catalysis Letters*, **2010**, 134:78–86. (*citations: 38*)
- D-3 Visible-light-driven hydrogen production with extremely high quantum efficiency on Pt-PdS/CdS photocatalyst, Hongjian Yan, Jinhui Yang, Guijun Ma, Guopeng Wu, Xu Zong, Zhibin Lei, Jingying Shi and **Can Li\***, *Journal of Catalysis*, **2009**, 266: 165-168. (*citations: 232*)
- D-4 Photocatalytic water oxidation on BiVO<sub>4</sub> with the electrocatalyst as an oxidation cocatalyst: Essential relations between electrocatalyst and photocatalyst, Donge Wang, Rengui Li, Jian Zhu, Jingying Shi, Jingfeng Han, Xu Zong, and **Can Li\***, *Journal of Physical Chemistry C*, **2012**, 116: 5082-5089. (*citations: 54*)
- D-5 Spatial Separation of Photogenerated Electrons and Holes among {010} and {110} Crystal Facets of BiVO<sub>4</sub>, Rengui Li, Fuxiang Zhang, Donge

Wang, Jingxiu Yang, Mingrun Li, Jian Zhu, Xin Zhou, Hongxian Han and **Can Li\***, *Nature. Communications*, **2013**, 4:1432. (*citations: 53*)

D-6 Roles of Cocatalysts in Photocatalysis and Photoelectrocatalysis, Jinhui Yang, Donge Wang, Hongxian Han, and **Can Li\***, *Accounts of Chemical Research*, **2013**, 46, 1900-1909. (*citations: 60*)

D-7 Dual Cocatalysts Loaded Type I CdS/ZnS Core/Shell Nanocrystals as Effective and Stable Photocatalysts for H<sub>2</sub> Evolution, Lei Huang, Xiuli Wang, Jinhui Yang, Gang Liu, Jingfeng Han, and **Can Li\***, *The Journal of Physical Chemistry C*, **2013**, 117 (22), 11584-11591. (*citations: 11*)

## **E Ultra Deep Desulfurization**

E-1 Hydrodesulfurization of 4,6-DMDBT on a multi-metallic sulfide catalyst with layered structure, Lu Wang, Yongna Zhang, Yuliang Zhang, Peng Liu, Hongxian Han, Min Yang, Zongxuan Jiang\* and **Can Li\***, *Applied Catalysis A: General*, **2011**, 394: 18-24. (*citations: 7*)

E-2 42 Granted Patents (see CV)

*End of August 2014*