

Meng Shang

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SUMMARY OF QUALIFICATIONS

- 7 years research experience in *materials chemistry and material science*.
- Strong background in *materials synthesis and characterization* and experience of applications in the field of *environment and energy*.
- Extensive experience in shape controlled synthesis of hierarchical *nano-, micro-structured oxide, ceramics, and metal*.
- **Extensive publication record** with over 40 high quality research papers, which were cited more than 1000 times (H-index: 21), and more than 7 conference proceedings.
- Proven success rate in *planning and drafting research grants* for funding from industrial and government sources.
- Experienced in *mentoring students and managing labs* as a senior supervisor.

EDUCATION

2006-2011 Ph.D. in Materials Chemistry and Physics GPA: 3.78/4.0

Shanghai Institute of Ceramics, Chinese Academy of Sciences (SICCAS), Shanghai, China

Dissertation title: Controllable synthesis of nanostructured Bismuth-based visible-light-driven photocatalysts with improved performance

Advisor: Prof. Dr. Wenzhong Wang

2002-2006 Bachelors in Materials Science and Engineering GPA: 3.51/4.0

Tianjin University, Tianjin, China

Dissertation title: Preparation and photocatalytic activity of titania nanowires by sol-template method

Advisor: Prof. Dr. Mingxia Xu

TECHNICAL SKILLS

- Profound knowledge & rich experience in chemistry and material science field.
- **Laboratory:**
 - Proficient material synthetic methods (solid-state method, wet-chemical method, sol-gel, hydrothermal, solvothermal, surfactant method, template method, electrospinning, ball mill, spray coating, and screen printing, *etc.*).
 - Master the modern analysis and testing technology of composition and structure (SEM, TEM, XRD, EDS, TG-DTA, UV-Vis, XPS, BET, FT-IR, GC-MS, and electrochemical instrument, *etc.*).
- **Computer:** Proficient Microsoft Office software, PC, and Mac; Familiar with Photoshop, Origin, EndNote, Highscore and Jade, *etc.*
- **General:** Ability to multi-task and work in a fast paced deadline-driven environment, organized, problem-solver, good teamwork; Proficient in writing, reading, and oral English and Mandarin.

RESEARCH EXPERIENCE

2011-Present Postdoctoral Fellow

Metallurgical and Materials Engineering, Colorado School of Mines, CO

- Fuel Cell.
 - Setup fuel cell lab and manage the lab.
 - Established the method for constructing and testing single-cell proton conducting fuel cells (PCFC) and solid oxide fuel cell (SOFC) by using electrochemical devices and GC/MS.
 - Synthesis, characterization, and application of novel nanoionics composite based on ceramic and metal nanoparticles as cathode and anode by using sol-gel method, screen printing, spray coating, and other solid/liquid methods.

- Developed novel nonstoichiometric mixed oxides for efficiently converting solar radiation to chemical fuels (Hydrogen Production and CO₂ Reduction).
 - For the first time developed the quick TGA screening method to obtain the potential materials.
 - Analyze the thermodynamic and kinetics property of the materials.
- Created the metal or metal oxide particles supported by mesoporous silica via sol-gel and supercritical methods.
 - Expanded utilization in various metals including Au, Ag, Cu, Pt, Pd, Ru.
 - Improved the efficiency in catalysis of C-C coupling reaction, oxidation of alcohol and alkane.
 - Established GC-MS separation method to determine the various product conversion and selectivity.

2006-2011 Research Assistant

State key Laboratory of High Performance Ceramics and Microstructure, Shanghai Institute of Ceramics, Chinese Academy of Sciences (SICCAS), Shanghai

- Realized the reduction of the grain size and enlargement of the specific surface area to improve the photocatalytic performance of the catalysts by using hydrothermal, ultrasonic-assisted, combustion, and template method.
- Improved the photocatalytic performance of spindle-like BiVO₄ and Bi₂WO₆ by the synthesis of composite with PANI, graphene, or doped photocatalyst with anion.
- For the first time developed a facile and economic Electrospinning technology for synthesis of practical materials and 3D hierarchical heterostructure Bi₂WO₆/TiO₂ nanofibrous mat with improved photocatalytic performance.
- Increased the scale of synthesis via a general approach developed by combining the practical electrospinning technique with the controllable hydrothermal method
- Controllable synthesis of different hierarchical nanostructures by using template method and different solution-phase method.
- Enhanced photocatalytic hydrogen evolution under visible light over Cd_{1-x}Zn_xS and Bi₃NbO₇, etc..

2010 Chemist

Dow Chemical, Shanghai

- Intern at R&D division and work with multiple divisions.
- Lead an independent project.
- Manage two technicians.
- Report to the manager and customer.

SELECTED PUBLICATIONS

1. **M. Shang**, W. Z. Wang, S. M. Sun, E. P. Gao, Z. J. Zhang, L. Zhang, R. O'Hayre, The design and realization of a large-area flexible nanofiber-based mat for pollutant degradation: an application in photocatalysis, *Nanoscale*, 2013, 5: 5036–5042.
2. **M. Shang**, J. H. Tong, R. O'Hayre, A novel wet-chemistry method for the synthesis of multicomponent nanoparticles: A case study of BaCe_{0.7}Zr_{0.1}Y_{0.1}B_{0.1}O_{3-δ}, *Materials Letters*, 2013, 92: 382-385.
3. **M. Shang**, J. H. Tong, R. O'Hayre, A promising cathode for intermediate temperature protonic ceramic fuel cells: BaCo_{0.4}Fe_{0.4}Zr_{0.2}O_{3-δ}, *RSC Advances*, 2013, 3: 15769-15775.
4. **M. Shang**, W. Z. Wang, J. Ren, S. M. Sun, L. Zhang, Nanoscale Kirkendall effect for the synthesis of Bi₂MoO₆ boxes via a facile solution-phase method, *Nanoscale*, 2011, 3 (4): 1474-1476.
5. **M. Shang**, W. Z. Wang, W. Z. Yin, J. Ren, S. M. Sun, L. Zhang, General Strategy for a Large-Scale Fabric with Branched Nanofiber-Nanorod Hierarchical Heterostructure: Controllable Synthesis and Applications, *Chem-Eur J*, 2010, 16 (37): 11412-11419.
6. **M. Shang**, W. Z. Wang, J. Ren, S. M. Sun, L. Zhang, A novel BiVO₄ hierarchical nanostructure: controllable synthesis, growth mechanism, and application in photocatalysis, *Crystengcomm*, 2010, 12 (6): 1754-1758.
7. **M. Shang**, W. Z. Wang, L. Zhang, H. L. Xu, Bi₂WO₆ with significantly enhanced photocatalytic activities by nitrogen doping, *Mater Chem Phys*, 2010, 120 (1): 155-159.
8. **M. Shang**, W. Z. Wang, J. Ren, S. M. Sun, L. Wang, L. Zhang, A practical visible-light-driven Bi₂WO₆ nanofibrous mat prepared by electrospinning, *J Mater Chem*, 2009, 19 (34): 6213-6218.

9. **M. Shang**, W. Z. Wang, L. Zhang, S. M. Sun, L. Wang, L. Zhou, 3D Bi₂WO₆/TiO₂ Hierarchical Heterostructure: Controllable Synthesis and Enhanced Visible Photocatalytic Degradation Performances, *J Phys Chem C*, 2009, 113 (33): 14727-14731.
10. **M. Shang**, W. Z. Wang, H. L. Xu, New Bi₂WO₆ Nanocages with High Visible-Light-Driven Photocatalytic Activities Prepared in Refluxing EG, *Cryst Growth Des*, 2009, 9 (2): 991-996.
11. **M. Shang**, W. Z. Wang, S. M. Sun, J. Ren, L. Zhou, L. Zhang, Efficient Visible Light-Induced Photocatalytic Degradation of Contaminant by Spindle-like PANI/BiVO₄, *J Phys Chem C*, 2009, 113 (47): 20228-20233.
12. **M. Shang**, W. Z. Wang, L. Zhou, S. M. Sun, W. Z. Yin, Nanosized BiVO₄ with high visible-light-induced photocatalytic activity: Ultrasonic-assisted synthesis and protective effect of surfactant, *J Hazard Mater*, 2009, 172 (1): 338-344.
13. **M. Shang**, W. Z. Wang, L. Zhang, Preparation of BiOBr lamellar structure with high photocatalytic activity by CTAB as Br source and template, *J Hazard Mater*, 2009, 167 (1-3): 803-809.
14. **M. Shang**, W. Z. Wang, S. M. Sun, L. Zhou, L. Zhang, Bi₂WO₆ nanocrystals with high photocatalytic activities under visible light, *J Phys Chem C*, 2008, 112 (28): 10407-10411.
15. W. Z. Wang, **M. Shang**, W. Z. Yin, J. Ren, L. Zhou, Recent Progress on the Bismuth Containing Complex Oxide Photocatalysts, *Journal of Inorganic Materials*, 2012, 27, 11-18.
16. X. Wang, L. F. Chen, **M. Shang**, F. Lin, J. C. Hu, R. M. Richards, Nanoscale gold intercalated into mesoporous silica as a highly active and robust catalyst, *Nanotechnology*, 2012, 23, 294010.
17. E. P. Gao, W. Z. Wang, **M. Shang**, J. H. Xu, Synthesis and enhanced photocatalytic performance of graphene-Bi₂WO₆ composite, *Phys Chem Chem Phys*, 2011, 13 (7): 2887-2893.
18. J. Ren, W. Z. Wang, **M. Shang**, S. M. Sun, E. P. Gao, Heterostructured Bismuth Molybdate Composite: Preparation and Improved Photocatalytic Activity under Visible-Light Irradiation, *ACS Appl. Mater. & Inter.*, 2011, 3 (7): 2529-2533.
19. J. Xu, W. Z. Wang, **M. Shang**, E. P. Gao, Z. J. Zhang, J. Ren, Electrospun nanofibers of Bi-doped TiO₂ with high photocatalytic activity under visible light irradiation, *J Hazard Mater*, 2011, 196, 426-430.
20. Z. J. Zhang, W. Z. Wang, **M. Shang**, W. Z. Yin, Low-temperature combustion synthesis of Bi₂WO₆ nanoparticles as a visible-light-driven photocatalyst, *J Hazard Mater*, 2010, 177 (1-3): 1013-1018.
21. Z. J. Zhang, W. Z. Wang, **M. Shang**, W. Z. Yin, Photocatalytic degradation of rhodamine B and phenol by solution combustion synthesized BiVO₄ photocatalyst, *Catal Commun*, 2010, 11 (11): 982-986.
22. J. H. Xu, W. Z. Wang, **M. Shang**, S. M. Sun, J. Ren, L. Zhang, Efficient visible light induced degradation of organic contaminants by Bi₂WO₆ film on SiO₂ modified reticular substrate, *Appl Catal B-Environ*, 2010, 93 (3-4): 227-232.
23. L. Wang, W. Z. Wang, **M. Shang**, W. Z. Yin, S. M. Sun, L. Zhang, Enhanced photocatalytic hydrogen evolution under visible light over Cd_{1-x}Zn_xS solid solution with cubic zinc blend phase, *Int J Hydrogen Energ*, 2010, 35 (1): 19-25.
24. L. Wang, W. Z. Wang, **M. Shang**, S. M. Sun, W. Z. Yin, J. Ren, J. Zhou, Visible light responsive bismuth niobate photocatalyst: enhanced contaminant degradation and hydrogen generation, *J Mater Chem*, 2010, 20 (38): 8405-8410.
25. S. M. Sun, W. Z. Wang, **M. Shang**, J. Ren, L. Zhang, Efficient catalytic oxidation of tetraethylated rhodamine over ordered mesoporous manganese oxide, *J Mol Catal a-Chem*, 2010, 320 (1-2): 72-78.
26. J. Ren, W. Z. Wang, **M. Shang**, S. M. Sun, L. Zhang, J. A. Chang, Photocatalytic activity of silver vanadate with one-dimensional structure under fluorescent light, *J Hazard Mater*, 2010, 183 (1-3): 950-953.
27. L. Zhang, W. Z. Wang, **M. Shang**, S. M. Sun, J. H. Xu, Bi₂WO₆@carbon/Fe₃O₄ microspheres: Preparation, growth mechanism and application in water treatment, *J Hazard Mater*, 2009, 172 (2-3): 1193-1197.
28. W. Z. Yin, W. Z. Wang, **M. Shang**, L. Zhou, S. M. Sun, L. Wang, BiVO₄ Hollow Nanospheres: Anchoring Synthesis, Growth Mechanism, and Their Application in Photocatalysis, *Eur J Inorg Chem*, 2009, (29-30): 4379-4384.
29. W. Z. Yin, W. Z. Wang, **M. Shang**, L. Zhang, J. Ren, Preparation of Monoclinic Scheelite BiVO₄ Photocatalyst by an Ultrasound-assisted Solvent Substitution Method, *Chem Lett*, 2009, 38 (5): 422-423.
30. Z. J. Zhang, W. Z. Wang, J. Xu, **M. Shang**, J. Ren, S. M. Sun, Enhanced photocatalytic activity of Bi₂WO₆ doped with up-conversion luminescence agent, *Catal Commun*, 2011, 13 (1): 31-34.
31. Z. J. Zhang, W. Z. Wang, E. P. Gao, **M. Shang**, J. H. Xu, Enhanced photocatalytic activity of Bi₂WO₆ with oxygen vacancies by zirconium doping, *J Hazard Mater*, 2011, 196, 255-262.

32. Z. J. Zhang, W. Z. Wang, W. Z. Yin, **M. Shang**, L. Wang, S. M. Sun, Inducing photocatalysis by visible light beyond the absorption edge: Effect of upconversion agent on the photocatalytic activity of Bi₂WO₆, *Appl Catal B-Environ*, 2010, 101 (1-2): 68-73.
33. S. M. Sun, W. Z. Wang, S. Z. Zeng, **M. Shang**, L. Zhang, Preparation of ordered mesoporous Ag/WO₃ and its highly efficient degradation of acetaldehyde under visible-light irradiation, *J Hazard Mater*, 2010, 178 (1-3): 427-433.
34. S. M. Sun, W. Z. Wang, L. Zhang, **M. Shang**, L. Wang, Ag@C core/shell nanocomposite as a highly efficient plasmonic photocatalyst, *Catal Commun*, 2009, 11 (4): 290-293.
35. L. Zhang, W. Z. Wang, L. Zhou, **M. Shang**, S. M. Sun, Fe₃O₄ coupled BiOCl: A highly efficient magnetic photocatalyst, *Appl Catal B-Environ*, 2009, 90 (3-4): 458-462.
36. S. M. Sun, W. Z. Wang, L. Zhang, **M. Shang**, Visible Light-Induced Photocatalytic Oxidation of Phenol and Aqueous Ammonia in Flowerlike Bi₂Fe₄O₉ Suspensions, *J Phys Chem C*, 2009, 113 (29): 12826-12831.
37. L. Zhang, W. Z. Wang, S. M. Sun, J. H. Xu, **M. Shang**, J. Ren, Hybrid Bi₂SiO₅ mesoporous microspheres with light response for environment decontamination, *Appl Catal B-Environ*, 2010, 100 (1-2): 97-101.
38. L. Zhou, W. Z. Wang, H. L. Xu, S. M. Sun, **M. Shang**, Bi₂O₃ Hierarchical Nanostructures: Controllable Synthesis, Growth Mechanism, and their Application in Photocatalysis, *Chem-Eur J*, 2009, 15 (7): 1776-1782.
39. S. M. Sun, W. Z. Wang, H. L. Xu, L. Zhou, **M. Shang**, L. Zhang, Bi₅FeTi₃O₁₅ Hierarchical Microflowers: Hydrothermal Synthesis, Growth Mechanism, and Associated Visible-Light-Driven Photocatalysis, *J Phys Chem C*, 2008, 112 (46): 17835-17843.
40. S. M. Sun, W. Z. Wang, L. Zhang, L. Zhou, W. Z. Yin, **M. Shang**, Visible Light-induced Efficient Contaminant Removal by Bi₅O₇I, *Environ Sci Technol*, 2009, 43 (6): 2005-2010.

SELECTED PRESENTATIONS

1. **M. Shang**, J. H. Tong, R. O'Hayre, A Novel BaCo_{0.4}Fe_{0.4}Zr_{0.2}O_{3-δ} Cathode for Intermediate Temperature Proton-Conducting SOFC, **222nd ECS-The Electrochemical Society**, Hawaii, US, 2012.
2. **M. Shang**, W. Wang, 3D Hierarchical Heterostructure: Controllable Synthesis and Enhanced Photocatalytic Degradation Performances, **ICC 3rd International Congress on Ceramics**, Osaka, Japan, 2010.
3. J. H. Tong, **M. Shang**, A. McDaniel, W. Chueh, R. O'Hayre, Nonstoichiometric oxides for solar thermochemical fuel production: Can we beat ceria, **SSI 19th International Conference on Solid State Ionics**, Kyoto, Japan, 2013.
4. W. Wang, **M. Shang**, Highly efficient photocatalysts of bismuth based oxides for environmental purification, **243rd ACS National Meeting**, San Diego, US, 2012.
5. X. Wang, **M. Shang**, J. J. Li, M. Risky, R. M Richards, Intercalation of palladium nanoparticles in the framework of mesoporous silica: Synthesis, characterization and catalytic application, **ACS Rocky Mt. Regional Meeting**, US, 2012.
6. W. Wang, **M. Shang**, L. Zhang, S. Sun, J. Ren, J. Xu, W. Yin, Visible-light-induced Photocatalysts with High Activity: Preparation and Photocatalysis, **ICC 3rd International Congress on Ceramics**, Osaka, Japan, 2010.
7. J. H. Tong, D. Clark, S. Nikodemski, **M. Shang**, A. M. Herring, C. Wolden, A. Bunge, R. O'Hayre, Nanoionics Applied to Proton Conducting Ceramics, **222nd ECS-The Electrochemical Society**, Hawaii, US, 2012.

PATENTS

1. W. Z. Wang, **M. Shang**, Preparation and application of 3D Bi₂WO₆/Oxide nanofibrous fabric with hierarchical heterostructure. Patent No. CN101623630.
2. W. Z. Wang, **M. Shang**, Preparation and application of Bi₂WO₆ nanofibrous fabric. Patent No. CN101612565.

AWARDS AND HONORS

- 2011: Chinese Academy of Sciences President Awards. (Top 0.5%)
- 2006-2010: First-level Scholarship (5 times, Top 10%); BHP Billiton-GUCAS Scholarship (Top 0.5%)
- 2002-2006: First-level Scholarship (once per year) (4 times, Top 10%); "Excellent student" Award (4 times, Top 5%).