

Resume

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Education

09/1984-06/1988 B.S. in Physical Chemistry, Department of Chemistry, Chengdu University of Science and Technology (now Sichuan University), P. R. China

09/1988 -06/1991 M.S. in Nuclear Magnetic Resonance, Wuhan Institute of Physics, CAS (supervisor: Prof. Youru Du)

09/1993 - 06/1996 Ph.D in Nuclear Magnetic Resonance, Wuhan Institute of Physics, CAS (supervisor: Prof. Chaohui Ye and Prof. Youru Du)

Postdoctoral Training

10/1997-12/1998 Research Fellow, Chemistry Department, Texas A & M University, USA (with Prof. James F. Haw; In-situ solid-state NMR studies of heterogeneous catalytic reactions on zeolites)

Faculty Academic Appointments

07/1991-05/1993 Research assistant, Wuhan Institute of Physics, CAS

06/1993-06/1996 Assistant professor, Wuhan Institute of Physics, CAS

07/1996-11/1999 Associate professor, Wuhan Institute of Physics and Mathematics, CAS

12/1999-present Professor, Wuhan Institute of Physics and Mathematics, CAS; Group Leader of Solid-state NMR Spectroscopy and Heterogeneous Catalysis

09/2008-present Deputy director of National Centre for Magnetic Resonance in Wuhan

04/2005-11/2016 Deputy director of State Key Laboratory of Magnetic Resonance and Atomic and Molecular Physics

12/2016-present Director of State Key Laboratory of Magnetic Resonance and Atomic and Molecular Physics

Main research activities:

Solid-state NMR methodology

Heterogeneous catalysts and catalytic reactions studied by solid-state NMR spectroscopy and DFT calculations

Solid-state NMR characterization of functional materials

Awards:

Chinese National Award for Magnetic Resonance Spectroscopy (2000)

Distinguished Young Scholars supported by National Science Foundation of China (Physical Chemistry, 2004)

Academic Positions:

Committee Member of Chinese Magnetic Resonance Society

Committee Member of Chinese Catalysis Society

Committee Member of Chinese Zeolite Society

International Editorial Board of *Solid State Nuclear Magnetic Resonance*

Editorial Board of *Chinese Science Bulletin*

Editorial Board of *Chinese Journal of Magnetic Resonance*

Editorial Board of *Acta Physico-Chimica Sinica*

Publications

More than 300 papers have been published in international journals including *JACS*, *Angew Chem Int Ed*, *Adv Mater*, *PRL*, *Nat Commun*, *Chem Rev*, *Acc Chem Res*, *Chem Sci*, *Chem Commun*, *JPC*, *JCP*, *PCCP*, *ACS Catal*, *J Catal*, *J Magn Reson*, *Solid State Nucl Magn Reson* etc, which have been cited over 8300 times by other authors in SCI journals. The selected publications are listed in the follows:

1. Wang, C.; Chu, Y. Y.; Xu, J.*; Wang, Q.; Qi, G. D.; Gao, P.; Zhou, X.; Deng, F.* Extra-framework aluminum-assisted initial C-C bond formation in methanol-to-olefins conversion on zeolite H-ZSM-5 *Angew. Chem. Int. Ed.* **2018**, 57: 10197-10201.
2. Gao, P.; Wang, Q.; Xu, J.*; Qi, G. D.; Wang, C.; Zhou, X.; Zhao, X. L.; Feng, N. D.; Liu, X. L.; Deng, F.* Brønsted/Lewis acid synergy in methanol-to-aromatics conversion on Ga-modified ZSM-5 zeolites as studied by solid-state NMR spectroscopy *ACS Catal.* **2018**, 8: 69-74.
3. Wang, W. Y.; Hu, H.; Xu, J.*; Wang, Q.; Qi, G. D.; Wang, C.; Zhao, X. L.; Zhou, X.; Deng, F.* Tuning Pd-Au bimetallic catalysts for heterogeneous parahydrogen-induced polarization *J. Phys. Chem. C* **2018**,122:1248-1257
4. Liu, F.; Feng, N. D.*; Yang, L. X.; Wang, Q.; Xu, J.; Deng, F.* Enhanced photocatalytic performance of carbon-coated TiO_{2-x} with surface-active carbon species *J. Phys. Chem. C.* **2018**,122:10948-10955.
5. Qi, G. D.; Wang, Q.; Xu, J.*; Wu, Q. M.; Wang, C.; Zhao, X. L.; Meng, X. J.; Xiao, F. S. Deng, F.* Direct observation of tin sites and their reversible interconversion in zeolites by solid-state NMR spectroscopy *Commun. Chem.* **2018**,1: 22
6. Li, W. Z.; Wang, Q.; Xu, J.*; Aussenac, F.; Qi, G. D.; Zhao, X. L.; Gao, P.; Wang, C.; Deng, F.* Probing the surface of γ -Al₂O₃ by oxygen-17 dynamic nuclear polarization enhanced solid-state NMR spectroscopy *Phys. Chem. Chem. Phys.* **2018**, 20:17218-17225
7. Wang, Q.; Trébosc, J.; Li, Y. X.; Lafon, O.; Xin, S. H.; Xu, J.; Hu, B. W.; Feng, N. D.; Amoureux, J. P.*; Deng, F.* Uniform signal enhancement in MAS NMR of half-integer quadrupolar nuclei using quadruple-frequency sweeps *J. Magn. Reson.* **2018**,293:92-103
8. Li, S. H.* ; Li, J.; Tang, J.; Deng F.* Host-guest interaction of styrene and ethylbenzene in MIL-53 studied by solid-state NMR *Solid State Nucl. Magn. Reson.* **2018**, 90:1-6
9. Liu, F.; Feng, N.D.*; Wang, Q.; Xu, J.; Qi, G.D.; Wang, C.; Deng, F.* Transfer Channel of Photoinduced Holes on a TiO₂ Surface As Revealed by Solid-State Nuclear Magnetic

Resonance and Electron Spin Resonance Spectroscopy *J. Am. Chem. Soc.* **2017**, 139, 10020-10028.

10. Zheng, A.M.*; Liu, S.B.*; Deng, F.* ³¹P NMR Chemical Shifts of Phosphorus Probes as Reliable and Practical Acidity Scales for Solid and Liquid Catalysts *Chem. Rev.* **2017**, 117: 12475-12531.
11. Wang, C.; Xu, J.*; Wang, Q.; Zhou, X.; Qi, G. D.; Feng, N.D.; Liu, X.L.; Meng, X.J.; Xiao, F.X.; Deng, F.* Host-Guest Interactions and Their Catalytic Consequences in Methanol to Olefins Conversion on Zeolites Studied by ¹³C-²⁷Al Double-Resonance Solid-State NMR Spectroscopy *ACS Catal.* **2017**, 7:6094-6103.
12. Wang, C.; Sun, X.Y.; Xu, J.*; Qi, G.D.; Wang, W.Y.; Zhao, X.L.; Li, W.Z.; Wang, Q.; Deng, F.* Impact of Temporal and Spatial Distribution of Hydrocarbon Pool on Methanol Conversion over H-ZSM-5 *J. Catal.* **2017**, 354, 138–151
13. Wang, X. M.; Xu, J.*; Qi, G. D.; Wang, C.; Wang, W. Y.; Gao, P.; Wang, Q.; Liu, X. L.; Feng, N. D.; Deng, F.* Carbonylation of Ethane with Carbon Monoxide over Zn-modified ZSM-5 Zeolites Studied by In situ Solid-state NMR spectroscopy *J. Catal.* **2017**, 345:228-235.
14. Xin, S.H.; Wang, Q.*; Xu, J.; Feng, N.D.; Li, W.Z.; Deng, F.* Heteronuclear Correlation Experiments of ²³Na-²⁷Al in Rotating Solids *Solid State Nucl. Magn. Reson.* **2017**,84:103–110.
15. Liu, X.L.; Chu, Y.Y.; Wang, Q.; Wang, W.Y.; Wang, C.; Xu, J.*; Deng, F.* Identification of Double Four-ring Units in Germanosilicate ITQ-13 Zeolite by Solid-state NMR Spectroscopy *Solid State Nucl. Magn. Reson.* **2017**, 87: 1–9
16. Wang, W.Y.; Xu, J.*; Zhao, Y.X.; Qi, G.D.; Wang, Q.; Wang, C.; Li, J.L.; Deng, F.* Facet Dependent Pairwise Addition of Hydrogen over Pd Nanocrystal Catalysts Revealed by NMR Using Para-hydrogen-induced Polarization *Phys. Chem. Chem. Phys.* **2017**, 19: 9349-9353.
17. Yi, Y.F.; Li, G.C.; Huang, L.; Chu, Y.Y.; Liu, Z.Q.; Xia, H.Q.; Zheng, A.M.*; Deng, F.* An NMR Scale for Measuring the Base Strength of Solid Catalysts with Pyrrole Probe: a Combined Solid-state NMR Experiment and Theoretical Calculation Study *J. Phys. Chem. C* **2017**, 121, 3887-3895.
18. Li, J.; Li, S.H.*; Zheng, A.M.; Liu, X.L.; Yu, N.Y.; Deng, F.* Solid-State NMR Studies of Host-Guest Interaction Between UiO-67 and Light Alkane at Room Temperature *J. Phys. Chem. C.* **2017**, 121: 14261–14268
19. Chu, Y.Y.; Li, G.C.; Huang, L.; Yi, X.F.; Xia, H.Q.; Zheng, A.M.*; Deng, F.* External or internal surface of H-ZSM-5 zeolite, which is more effective for the Beckmann rearrangement reaction? *Catal. Sci. Technol.* **2017**, 7:2512-2523.
20. Li, S.H.; Li, J.; Zheng, A.M.; Deng, F.* Solid-State NMR Characterization of the Structure and Catalytic Reaction Mechanism of Solid Acid Catalysts *Acta Phys.-Chim. Sin.* **2017**, 33: 270-282
21. Marchetti, A.; Chen, J.; Pang, Z.F.; Li, S.H.; Ling, D.H.; Deng, F.*; Kong, X.Q.* Understanding Surface and Interfacial Chemistry in Functional Nanomaterials via Solid-State NMR *Adv. Mater.* **2017**, 1605895
22. Zheng, A.M.; Li, S.H.; Liu, S. B.*; Deng, F.* Acidic properties and structure-activity correlations of solid acid catalysts revealed by solid-state NMR spectroscopy *Acc. Chem. Res.* **2016**, 49: 655-663.

23. Wang, C.; Wang, Q.; Xu, J.*; Qi, G.D.; Gao, P.; Wang, W.Y.; Zou, Y.Y.; Feng, N.D.; Liu, X.L.; Deng, F.* Direct detection of superamolecular reaction centers in the methanol-to-olefins conversion over zeolite H-ZSM-5 by ^{13}C - ^{27}Al solid-state NMR spectroscopy *Angew. Chem. Int. Ed.* **2016**, 55:2507-2511.
24. Qi, G.D.; Wang, Q.; Xu, J.*; Trebosc, J.; Lafon, O.; Wang, C.; Amoureux, J.P.; Deng F.* Synergic Effect of Active Sites in Zinc-Modified ZSM-5 Zeolites as Revealed by High-Field Solid-State NMR Spectroscopy *Angew. Chem. Int. Ed.* **2016**, 55:15826–15830.
25. Huang, M.D.; Wang, Q.; Yi, X.; Chu, Y.; Dai, W.L.; Li, L.D.; Zheng, A.M.*; Deng F.* Insight into the formation of the *tert*-butyl cation confined inside H-ZSM-5 zeolite from NMR spectroscopy and DFT calculations *Chem. Commun.* **2016**, 52, 10606-10608.
26. Song, B.T.; Chu, Y.Y.; Li, G.C.; Wang, J.Q.; Lo, A.Y.; Zheng, A.M.*; Deng, F.* Origin of Zeolite Confinement Revisited by Energy Decomposition Analysis *J. Phys. Chem. C* **2016**, 120:27349-27363.
27. Zhou, L.; Li, S.H.*; Qi, G.D.; Su, Y.C.; Li, J.; Zheng, A.M.; Yi, X.; Wang, Q.; Deng, F.* Methanol carbonylation over copper-modified mordenite zeolite: A solidstate NMR study *Solid State Nucl. Magn. Reson.* **2016**, 80: 1–6.
28. Zhou, L.; Li, S.H.*; Li, J.; Wang, Q.; Deng, F.* Valence state alternation of copper species doped in HY zeolite as revealed by paramagnetic relaxation enhancement NMR spectroscopy *Solid State Nucl. Magn. Reson.* **2016**, 74-75: 10–15.
29. Feng, N.D.; Liu, F.; Huang, M.; Zheng, A.M.; Wang, Q.; Chen, T.H.; Cao, G.Y.; Xu, J.; Fan, J.; Deng, F.* Unravelling the Efficient Photocatalytic Activity of Boron-induced Ti^{3+} Species in the Surface Layer of TiO_2 *Sci. Rep.* **2016**, 6:34765.
30. Yi, X.F.; Ding, L.H.; Li, G.C.; Liu, Z.Q.; Xia, H.; Chu, Y.Y.; Zheng, A.M.*; Deng, F.* Insights into the reaction mechanism of propene H/D exchange over acidic zeolite catalysts from theoretical calculations *Catal. Sci. Technol.* **2016**, 6:6328-6338.
31. Chu, Y.Y.; Xue, N.H.; Xu, B.L.; Ding, Q.; Feng, Z.C.; Zheng, A.M.*; Deng, F.* Mechanism of alkane H/D exchange over zeolite H-ZSM-5 at low temperature: a combined computational and experimental study *Catal. Sci. Technol.* **2016**, 6:5350-5363.
32. Sheng, N.; Chu, Y.Y.; Xin, S.H.; Wang, Q.; Yi, X.F.; Feng, Z.C.; Meng, X.J.*; Liu, X.L.*; Deng, F.; Xiao, F.S.* Insights of the crystallization process of molecular sieve AlPO_4 -5 prepared by solvent-free synthesis *J. Am. Chem. Soc.* **2016**, 138:6171–6176.
33. Xu, L.; Ji, X.Y.; Li, S.H.; Zhou, Z.Y.; Du, X.; Sun, J.L.; Deng, F.; Che, S.A.; Wu, P.* Self-Assembly of Cetyltrimethylammonium Bromide and Lamellar Zeolite Precursor for the Preparation of Hierarchical MWW Zeolite *Chem. Mater.* **2016**, 28: 4512-4521.
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35. Li, S. H.; Julien Trébosc J.; Lafon O.*; Zhou L.; Shen M.; Pourpoint F.; Amoureux J.P.*; Deng, F.* Observation of ^1H - ^{13}C and ^1H - ^1H proximities in a paramagnetic solid by NMR at high magnetic field under ultra-fast MAS. *J. Magn. Reson.* **2015**, 251:36-42.
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37. Wang, C.; Xu, J.*; Qi, G. D.; Gong, Y.J.; Wang, W. Y.; Gao, P.; Wang, Q.; Feng, N. D.; Liu, X.; Deng, F.* Methylbenzene hydrocarbon pool in methanol-to-olefins conversion over zeolite H-ZSM-5 *J. Catal.* **2015**, 332: 127–137.
38. Wang, C.; Yi, X.F.; Xu, J.*; Qi, G.D.; Gao, P.; Wang, W.Y.; Chu, Y.Y.; Wang, Q.; Feng, N.D.; Liu, X.L.; Zheng, A.M.; Deng, F.* Experimental evidence on the formation of ethene through carbocations in methanol conversion over H-ZSM-5 Zeolite *Chem. Eur. J.* **2015**, 21: 12061-12068.
39. Chu, Y.Y.; Ji, P.; Yi, X.F.; Li, S.H.; Wu, P.; Zheng, A.M.*; Deng, F.* Strong or weak acid, which is more efficient for Beckmann rearrangement reaction over solid acid catalysts? *Catal. Sci. Technol.* **2015**, 5: 3675-3681.
40. Chu, Y.Y.; Sun, X.Y.; Yi, X.F.; Ding, L.H.; Zheng, A.M.*; Deng, F.* Slight channel difference influences the reaction pathway of methanol-to-olefins conversion over acidic H-ZSM-22 and H-ZSM-12 zeolites *Catal. Sci. Technol.* **2015**, 5: 3507-3517.
41. Zhou, L.; Li, S.H.*; Su, Y.C.; Li, B.J.; Deng, F.* Paramagnetic relaxation enhancement solid-state NMR studies of heterogeneous catalytic reaction over HY zeolite using natural abundance reactant *Solid State Nucl. Magn. Reson.* **2015**, 66-67: 29–32.
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43. Sun, Q.; Dai, Z.F.; Liu, X.L.; Sheng, N.; Deng, F.; Meng, X.J.; Xiao, F.S.* Highly Efficient Heterogeneous Hydroformylation over Rh-Metalated Porous Organic Polymers: Synergistic Effect of High Ligand Concentration and Flexible Framework *J. Am. Chem. Soc.* **2015**, 137:5204-5209.
44. Su, X.; Xu, S.T.; Tian, P.; Li, J.Z.; Zheng, A.M.; Wang, Q.; Yang, M.; Wei, Y. X.; Deng, F.; Liu, Z.M.* Investigation of the Strong Brønsted Acidity in a Novel SAPO-type Molecular Sieve, DNL-6 *J. Phys. Chem. C* **2015**, 119:2589-2596.
45. Li, S. H.; Pourpoint, F.; Trebosc, J.; Zhou, L.; Lafon, O.; Shen, M.; Zheng, A. M.; Wang, Q.; Amoureux, J. P.*; Deng, F.* Host-Guest Interactions in Dealuminated HY Zeolite Probed by ¹³C-²⁷Al Solid-State NMR Spectroscopy *J. Phys. Chem. Lett.* **2014**, 5: 3068-3072.
46. Wang, X. M.; Xu, J.*; Qi, G.; Wang, C.; Deng, F.* Alkylation of benzene with carbon monoxide over Zn/H-ZSM-5 zeolite studied by in situ solid-state NMR spectroscopy. *Chem. Commun.* **2014**, 50 : 11382-11384.
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48. Wang, C.; Chu, Y.; Zheng, A.; Xu, J.*; Wang, Q.; Gao, P.; Qi, G.; Gong, Y.; Deng, F.* New insight into the hydrocarbon pool chemistry of methanol to olefins conversion over zeolite H-ZSM-5 from GC-MS, solid-state NMR spectroscopy and DFT calculations *Chem. Eur. J.* **2014**, 20 :12432-12443.
49. Ye, H. Y.; Li, S. H.; Zhang, Y.; Zhou, L.; **Deng, F.**; Xiong, R. G.* Solid State Molecular Dynamic Investigation of An Inclusion Ferroelectric: (2,6-Diisopropylanilinium) (18-crown-6)BF₄. *J. Am. Chem. Soc.* **2014**, 136: 10033-10040.
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Addition of Both Organotemplates and Solvents. *J. Am. Chem. Soc.* **2014**, 136:4019-4025.

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54. Liu, B.; Ben, T.*; Xu, J.; Deng, F.; Qiu, S.* Hydrogen bonding controlled catalysis of a porous organic framework containing benzimidazole moieties. *New J. Chem.* **2014**, 38: 2292-2299.
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58. Li, S.H.; **Deng, F.** Recent Advances of Solid-State NMR Studies on Zeolites *Annu. Rep. NMR Spectro.* **2013**, 78 :1-54.
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60. Zhou, L.; Li, S.H.*; Su, Y.C.; Yi, X.F.; Zheng, A.M.; Deng, F.* Interaction between Histidine and Zn(II) Metal Ions over a Wide pH as Revealed by Solid-State NMR Spectroscopy and DFT Calculations *J. Phys. Chem. B* **2013**, 117: 8954–8965.
61. Yi X.F., Byun Y., Chu Y.Y., Zheng A.M.*, Hong S.B.*, Deng F.* Stability of the Reaction Intermediates of Ethylbenzene Disproportionation over Medium-Pore Zeolites with Different Framework Topologies: A Theoretical Investigation *J. Phys. Chem. C* **2013**, 117: 23626-23637
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Study, *J. Phys. Chem. C* **2012**, 116: 12687-12695.

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Invited Review Articles:

1. Zheng, A.M.; Liu, S.B.; Deng, F. ³¹P NMR Chemical Shifts of Phosphorus Probes as Reliable and Practical Acidity Scales for Solid and Liquid Catalysts *Chem. Rev.* **2017**, 117: 12475-12531.

2. Li, S.H.; LI, J.; Zheng, A.M. Deng, F. Solid-State NMR Characterization of the Structure and Catalytic Reaction Mechanism of Solid Acid Catalysts *Acta Phys.-Chim. Sin.* **2017**, 33: 270-282.
3. Zheng, A.M.; Li, S.H.; Liu, S. B.; Deng, F. Acidic Properties and Structure-activity Correlations of Aolid Acid Catalysts Revealed by Solid-state NMR Spectroscopy *Acc. Chem. Res.* **2016**, 49: 655-663.
4. Li, S.H. ; Zhou, L.; Zheng, A.M.; Deng, F. Recent Advances in Solid-state NMR Characterization of Zeolites *Chin. J. Catal.* **2015**, 36 :789–796.
5. Zheng, A. M., Deng, F., Liu S. B. Acidity Characterization of Solid Acid Catalysts by Solid-State ³¹P NMR of Adsorbed Phosphorus Containing Probe Molecules *Annual Reports on NMR Spectroscopy*, **2014**, 81: 47-108.
6. Li, S.H.; Deng, F. Recent Advances of Solid-state NMR Studies on Zeolites *Annual Reports on NMR Spectroscopy*, **2013**, 78: 1-45.
7. Zheng, A.M., Liu, S.B., Deng, F. Acidity Characterization of Heterogeneous Catalysts by Solid-state NMR Spectroscopy Using Probe Molecules. *Solid State Nucl. Magn. Reson.* **2013**, 55-56: 12-27.
8. Zheng, A.M., Huang, S.J., Wang, Q., Zhang, H.L., Deng, F., Liu, S.B. Progress in Development and Application of Solid-state NMR for Solid Acid Catalysis. *Chin. J. Catal.* **2013**, 34: 436-491.
9. Zheng, A.M.; Huang, S.J.; Liu, S.B.; **Deng, F.** Acid Properties of Solid Acid Catalysts Characterized by Solid-state ³¹P NMR of Adsorbed Phosphorous Probe Molecules *Phys. Chem. Chem. Phys.* **2011**, 13:14889-14901.
10. Yu, Z. W.; Zheng, A. M.; Wang, Q. A.; Deng, F. Application of Two-dimensional Double Quantum Magic Angle Spinning NMR to Solid Functional Materials *Chemical Journal of Chinese Universities-Chinese* **2011**, 32: 471-484.
11. Yu, Z.W.; Zheng, A.M.; Wang,Q.; Huang, S.-J.; Deng, F.; Liu, S.B. Acidity Characterization of Solid Acid Catalysts by Solid-State NMR Spectroscopy: A Review on Recent Progresses. *Chin. J. Magn. Reson.* **2010**, 27: 485–515.
12. Deng, F.; Yang, J.; Ye, C.H. Solid-state NMR characterization of solid surface of heterogeneous catalysts *Modern Magnetic Resonance*, Graham A. Webb (ed.) **2005**, 205-211.

Book Chapter

1. Shenhui Li and Feng Deng Chapter 7 Solid-State NMR Studies of Zeolites, F.S. Xiao, X. Meng (ed), *Zeolites in Sustainable Chemistry*, Green Chemistry and Sustainable Technology, Springer-Verlag Berlin Heidelberg **2015**, page 231-268.

Selected Presentations:

1. Surface acidity of BF₃/Al₂O₃ catalyst as studied by solid-state NMR and theoretical calculation. Invited lecture, the 1st Asia-Pacific NMR Symposium, November 9-11, **2005**, Yokohama, Japan

2. Solid-state NMR spectroscopy and its application to heterogeneous catalysts, Invited lecture, the 1st Sino-French Workshop on Solid-state NMR Spectroscopy, October 17-21, **2006**, Wuhan, China
3. Solid-state NMR studies on solid acid catalysts, Plenary lecture, the 14th Chinese National Magnetic Resonance Conference, October 11-13, **2006**, Xi'an, China.
4. A Combined Solid-State NMR Spectroscopy and Theoretical Calculation Study of Bronsted/Lewis Acid Synergy in Dealuminated Y Zeolite. Invited lecture, the 16th ISMAR (International Society for Magnetic Resonance) Conference, October 14-19, **2007**, Kenting, Taiwan
5. Solid-state NMR spectroscopy: principle and application. Invited lecture, Advanced Class of Modern Characterization Techniques for Catalysis, October 26-30, **2007**, Dalian, China.
6. Solid-state NMR spectroscopy. Invited lecture, Bruker Workshop on Solid-state NMR spectroscopy, April 4-6, **2008**, Beijing, China.
7. Brønsted/Lewis Acid Synergy in Microporous Zeolites Studied by Solid-State NMR Spectroscopy and Theoretical Calculation. Invited lecture, the 13th Asian Chemical Conference, September 14-16, **2009**, Shanghai, China.
8. Solid-state NMR studies of spatial proximity between different acid sites in zeolites, Keynote lecture, the 15th Chinese National Conference on Zeolites, October 12-15, **2009**, Luoyang, China
9. Spatial Proximity of Acid Sites in Microporous Zeolites as Studied by ^1H - ^1H and ^{27}Al - ^{27}Al DQ MAS Solid-state NMR Spectroscopy. Invited lecture, Joint EUROMAR **2010** and 17th ISMAR (International Society for Magnetic Resonance) conference, July 4-9, **2010**, Florence, Italy.
10. Surface acidity of solid acid catalysts studied by solid-state NMR spectroscopy and theoretical DFT calculations. Invited lecture, the 240th ACS National Meeting, August 22-27, **2010**, Boston, USA.
11. Solid-state NMR characterization of heterogeneous catalysts. Invited lecture, the 2nd Sino-French Workshop on Solid-state NMR Spectroscopy, November 1-3, **2010**, Wuhan, China
12. Two-dimensional ^1H - ^1H and ^{27}Al - ^{27}Al DQ MAS Solid-state NMR Studies of Spatial Proximity of Acid Sites in Zeolites. Invited lecture, the 4th Asia-Pacific NMR Symposium, October 16-19, **2011**, Beijing, China
13. Solid-state NMR and DFT calculation studies of zeolites. Keynote lecture, the 16th Chinese National Conference on Zeolites, October 14-17, **2011**, Beijing, China
14. Bronsted/Lewis Acid Synergy in Zeolites Studied by Two-dimensional ^1H - ^1H and ^{27}Al - ^{27}Al DQ MAS Solid-state NMR Spectroscopy. Invited lecture, Frontiers Seminar Series, Pacific Northwest National Laboratory, April 23, **2011**, Richland, Washington, USA.
15. Solid-state NMR Studies of Heterogeneous Catalysts, Invited lecture, the 6th Pacific Basin Conference on Adsorption Science and Technology, May 20-23, **2012**, Taipei, Taiwan.
16. Two-dimensional ^1H - ^1H and ^{27}Al - ^{27}Al DQ MAS Solid-state NMR Studies of Zeolites, Invited lecture, the 41th Korean Magnetic Resonance Society Conference, June 28-30, **2012**, Jeju Island, Korea.

17. Methane activation and conversion over Zn modified ZSM-5 Zeolites studied by Solid-state NMR spectroscopy and DFT Calculation. Invited lecture, the 6th Asia-Pacific Congress on Catalysis, October 14-17, **2013**, Taipei, Taiwan.
18. Solid-state NMR studies of heterogeneous catalysts and catalytic reactions. Invited lecture, the 3rd Sino-French Workshop on Solid-state NMR Spectroscopy, May 9-11, **2013**, Dalian, China
19. Solid acid catalysts and catalytic reactions studied by solid-state NMR and DFT calculations. Keynote lecture, the 17th Chinese National Conference on Zeolites, Aug 29- Sept 2, **2013**, Yinchuan, China.
20. Solid-state NMR and theoretical DFT calculation studies on solid acid catalysts and related catalytic reactions. Invited lecture, the 55th ENC (Experimental Nuclear Magnetic Resonance Conference), March 23-28, **2014**, Boston, USA.
21. Solid-state NMR and theoretical DFT calculation studies on solid acid catalysts and related catalytic reactions. Invited lecture, the 29th National Conference of Chinese Chemical Society (porous functional materials section), August 4-7, **2014**, Beijing, China
22. Solid acid catalysts and related catalytic reactions studied by solid-state NMR spectroscopy and DFT calculations. Keynote lecture, the 17th Chinese National Conference on Catalysis, October 13-17, **2014**, Hanzhou, China
23. Solid-state NMR and theoretical DFT calculation studies on solid acid catalysts and catalytic reactions. Plenary lecture, 18th Chinese National Conference on Zeolites, October 25-28, **2015**, Shanghai, China.
24. Solid-state NMR Studies on Methane Conversion over Zn Modified ZSM-5 Zeolites. Invited lecture, the 19th ISMAR (International Society for Magnetic Resonance) Conference, August 16-21, **2015**, Shanghai, China.
25. Methane and CO activation and conversion over Zn-modified ZSM-5 zeolites studied by solid-state NMR and ESR spectroscopy, Invited lecture, the 16th International Congress on Catalysis, July 3-8, **2016**, Beijing, China
26. Solid-state NMR studies of solid acid catalysts and related catalytic reactions. Invited lecture, 2016 Lanzhou International Workshop on Solid-state Nuclear Magnetic Resonance, August 19-21, **2016**, Lanzhou, China