

Resume

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Gender: Male

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Education

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

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 280 papers have been published in international journals including *JACS*, *Angew Chem Int Ed*, *Acc Chem Res*, *Nat Commun*, *Chem Sci*, *Chem Commun*, *JPC*, *JCP*, *PCCP*, *J Catal*, *J Magn Reson* etc, which have been cited over 6200 times by other authors in SCI journals. The selected publications are listed in the following:

1. 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.
2. Xin, S.H.; Wang, Q.; Xu, J.; Feng, N.D.; Li, W.Z.; **Deng, F.** Heteronuclear correlation experiments of ^{23}Na - ^{27}Al in rotating solids *Solid State Nucl. Magn. Reson.* **2017**, in press.
3. 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 via NMR using para-hydrogen-induced polarization *Phys. Chem. Chem. Phys.* **2017**, in press.
4. An NMR scale for measuring the base strength of solid catalysts with pyrrole probe: a combined solid-state NMR experiment and theoretical calculation study Yi, X.F.; Li, G.C.; Huang, L.; Chu, Y.Y.; Liu, Z.Q.; Xia, H.Q.; Zheng, A.M.; **Deng, F.** *J. Phys. Chem. C* **2017**, 121, 3887-3895.
5. 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.
6. 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.
7. 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.
8. Huang, M.D.; Wang, Q.; Yi, X.F.; Chu, Y.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.
9. 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.
10. Zhou, L.; Li, S.H.; Qi, G.D.; Su, Y.C.; Li, J.; Zheng, A.M.; Yi, X.F.; Wang, Q.; **Deng, F.** Methanol carbonylation over copper-modified mordenite zeolite: A solidstate NMR study *Solid State Nucl. Magn. Reson.* **2016**, 80: 1–6.

11. 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.
12. 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.
13. Yi, X.F.; Ding, L.H.; Li, G.C.; Liu, Z.Q.; Xia, H.Q.; 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.
14. 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.
15. 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.
16. Wang, C.; Xu, J.; Qi, G. D.; Gong, Y.J.; Wang, W. Y.; Gao, P.; Wang, Q.; Feng, N. D.; Liu, X. L.; **Deng, F.** Methylbenzene hydrocarbon pool in methanol-to-olefins conversion over zeolite H-ZSM-5 *J. Catal.* **2015**, 332: 127–137.
17. 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.
18. Qi, G.D.; Wang, Q.; Chu, Y.Y.; Xu, J.; Zheng, A.M.; Su, J.H.; Chen, J.F.; Wang, C.; Wang, W.Y.; Gao, P.; **Deng, F.** Room temperature stable zinc carbonyl complex formed in zeolite ZSM-5 and its hydrogenation reactivity: a solid-state NMR study *Chem. Commun.* **2015**, 51: 9177-9180
19. 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.
20. 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.
21. Wang, Q.; Li, Y.X.; Trépoosc, J.; Lafon, O.; Xu, J.; Hu, B.W.; Feng, N.D.; Chen, Q.; Amoureux, J.P.; **Deng, F.** Population transfer HMQC for half-integer quadrupolar nuclei *J. Chem. Phys.* **2015**, 142 : 094201.
22. Li, S. H.; Julien Trépoosc 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.
23. 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.
24. Wu, Q.M.; Liu, X.L.; Zhu, L.F.; Ding, L.H.; Gao, P.; Wang, X.; Pan, S.X.; Bian, C.Q.; Meng, X.J.; Xu, J.; **Deng, F.**; Maurer, S.; Muller, U.; Xiao, F.S. Solvent-Free Synthesis of Zeolites from Anhydrous Starting Raw Solids *J. Am. Chem. Soc.* **2015**, 137:1052-1055.
25. 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.

26. 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.
27. 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 ^{13}C - ^{27}Al Solid-State NMR Spectroscopy *J. Phys. Chem. Lett.* **2014**, 5: 3068-3072.
28. Wang, X.; 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.
29. Zheng, A. M.; Chu, Y. Y.; Li, S. H.; Su, D. S.; **Deng, F.** Insight into the activation of light alkanes over surface-modified carbon nanotubes from theoretical calculations. *Carbon* **2014**, 77 : 122-129.
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31. 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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33. Hung, C. T.; Yu, N. Y.; Chen, C. T.; Wu, P. H.; Han, X. X.; Kao, Y. S.; Liu, T. C.; Chu, Y. Y.; **Deng, F.**; Zheng, A. M.; Liu, S. B. Highly nitrogen-doped mesoscopic carbons as efficient metal-free electrocatalysts for oxygen reduction reactions. *J. Mater. Chem. A* **2014**, 2: 20030-20037.
34. Huang, S. J.; Hung, C. T.; Zheng, A. M.; Lin, J. S.; Yang, C. F.; Chang, Y. C.; **Deng, F.**; Liu, S. B. Capturing the Local Adsorption Structures of Carbon Dioxide in Polyamine-Impregnated Mesoporous Silica Adsorbents. *J. Phys. Chem. Lett.* **2014**, 5: 3183-3187.
35. Xi, D.; Sun, Q.; Xu, J.; Cho, M.; Cho, H. S.; Asahina, S.; Li, Y.; **Deng, F.**; Terasaki, O.; Yu, J., In situ growth-etching approach to the preparation of hierarchically macroporous zeolites with high MTO catalytic activity and selectivity. *J. Mater. Chem. A* **2014**, 2: 17994-18004.
36. 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.
37. Qi, G. D.; Xu, J.; Su, J. H.; Chen, J. H.; Wang, X. M.; **Deng, F.** Low-temperature reactivity of Zn⁺ ions confined in ZSM-5 zeolite toward carbon monoxide oxidation: insight from in situ DRIFT and ESR spectroscopy *J. Am. Chem. Soc.* **2013**, 135 : 6762-6765.
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39. Wang, X.M.; Xu, J.; Qi, G.D.; Li, B.J.; Wang, C.; **Deng, F.** Alkylation of Benzene with methane over ZnZSM-5 zeolites studied with solid-state NMR spectroscopy *J. Phys. Chem. C* **2013**, 117: 4018-4023

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42. Chu, Y.Y., Han, B., Zheng, A.M., Yi, X.F., **Deng, F.** Pore Selectivity for Olefin Protonation Reactions Confined inside Mordenite Zeolite: A Theoretical Calculation Study. *J. Phys. Chem. C* **2013**, 117: 2194-2202.
43. Zhou H.L., Lin R.B., He C.T., Zhang Y.B., Feng N.D., Wang Q., **Deng F.**, Zhang J.P., Chen X.M. Direct visualization of a guest-triggered crystal deformation based on a flexible ultramicroporous framework *Nat. Commun.* **2013**, 4:2534
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46. Fu, D.W., Cai, H.L., Li, S.H., Ye, Q., Zhou, L., Zhang, W., Zhang, Y., **Deng, F.**, Xiong, R.G. 4-Methoxyanilinium Perrhenate 18-Crown-6: A New Ferroelectric with Order Originating in Swinglike Motion Slowing Down *Phys. Rev. Lett.* **2013**, 110, 257601.
47. Xu S.T., Zheng A.M., Wei Y.X., Chen J.R., Li J.Z., Chu Y.Y., Zhang M.Z., Wang Q.Y., Zhou Y., Wang J.B., **Deng F.**, Liu Z.M. Direct Observation of Cyclic Carbenium Ions and Their Role in the Catalytic Cycle of the Methanol-to-Olefin Reaction over Chabazite Zeolites *Angew. Chem. Int. Ed.* **2013**, 52 :11564-11568.
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49. Xu, J.; Zheng, A. M.; Wang, X. M.; Qi, G.D.; Su, J.H.; Du, J.F.; Gan, Z.H.; Wu, J.F.; Wang, W.; **Deng, F.** Room-temperature activation of methane over Zn modified H-ZSM-5 Zeolites: Insight from solid-state NMR and theoretical calculations. *Chem. Sci.* **2012**, 3:2932-2940.
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51. Chu Y., Han B., Zheng A., **Deng F.** Influence of Acid Strength and Confinement Effect on the Ethylene Dimerization Reaction over Solid Acid Catalysts: A Theoretical Calculation Study, *J. Phys. Chem. C* **2012**, 116: 12687-12695.
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Zeolite Studied by ^1H and ^{27}Al DQ-MAS NMR Spectroscopy *Chinese Journal of Catalysis*, **2012**, 33: 129-139.

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Hydrocarbon Protonation Reaction *J. Phys. Chem. C* **2010**, 114, 10254-10264.

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Invited Review Articles:

1. 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.
2. 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.
3. Zheng, A. M., **Deng, F.**, Liu S. B. Acidity Characterization of Solid Acid Catalysts by Solid-State ^{31}P NMR of Adsorbed Phosphorus Containing Probe Molecules *Annual Reports on NMR Spectroscopy*, **2014**, 81: 47-108.
4. Li, S.H.; **Deng, F.** Recent advances of solid-state NMR studies on zeolites *Annual Reports on NMR Spectroscopy*, **2013**, 78: 1-45.
5. 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.
6. 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.
7. Zheng, A.M.; Huang, S.J.; Liu, S.B.; **Deng, F.** Acid properties of solid acid catalysts characterized by solid-state ^{31}P NMR of adsorbed phosphorous probe molecules *Phys. Chem. Chem. Phys.* **2011**, 13:14889-14901.
8. **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 $\text{BF}_3/\text{Al}_2\text{O}_3$ 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