Zhen-Zhen Yang

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Address: 1 Bethel Valley Rd, Oak Ridge, TN 37830, USA

Date of Birth: 05/09/1986

Professional Experience & Education

R&D Associate Staff Member **08/2020~present**

Oak Ridge National Laboratory, USA

Group leader: Prof. Sheng Dai

Postdoc **07/2018~2020/07**

The University of Tennessee, Knoxville, USA

Group leader: Prof. Sheng Dai

Associate Professor **02/2016~06/2018**

Assistant Professor **07/2013~01/2016**

Institute of Chemistry, Chinese Academy of Sciences, Beijing, China

Group leader: Prof. Buxing Han/Prof. Zhimin Liu

Learning Exchange **12/2012~05/2013**

The University of Tennessee, Knoxville/Oak Ridge National Laboratory, USA

Supervisor: Prof. Sheng Dai

PhD of Organic Chemistry **09/2008~06/2013**

State Key Laboratory of Elemento-Organic Chemistry, Nankai University, Tianjin, China

Supervisor: Prof. Liangnian He

Thesis topic: Carbon dioxide capture with activation and chemical transformation by task-specific ionic liquids

BS of Chemistry and Biology **09/2004~06/2008**

Central China Normal University, Wuhan, China

Publications & Fundings & Research interest

- ### Publications

Have published **55 SCI papers and book/chapters (as first or corresponding author)**, including Chem (1), J. Am. Chem. Soc. (2), Angew. Chem. Int. Ed. (4), ACS Cent. Sci. (1), Adv. Mater. (1), Energy Environ. Sci. (2), ACS Energy Lett. (1), ACS Catal. (1), Adv. Funct. Mater. (1), J. Mater. Chem. (3), Chem. Mater. (1), Green Chem. (6), Org. Lett. (2), Chem. Commun. (7), Adv. Synth. Catal. (2) and others (See the appendix). My total **citations are 5035** (4024 since 2016), and **h-index is 39** (google scholar).

- ### Presided Fundings

1. As co-PI, Source of Support: DOE/BES, Integrated Direct Air Capture and H_2-Free CO_2 Valorization, Award

Number: ERKCG27, Total Award Amount: $1,200K/year (8-PI in total).

2. As co-PI, Source of Support: DOE/BES, Fundamental Studies of Novel Separations, Award Number: ERKCT08, Total Award Amount: $2,475K/year (3-PI in total).
3. As co-PI, Source of Support: DOE/BES, Fundamentals of Catalysis and Chemical Transformations, Award Number: ERKCC96, Total Award Amount: $6,867K/year (9-PI in total).
4. As leading PI, LDRD project in ORNL, project No. 10605, Total award amount: $150,000, 04/2021~09/2021; Tandem Capture and Electroreduction of CO_2
5. National Natural Science Foundation of China, Grant No. 21673256, Direct Fund: ￥650,000, 01/2017~12/2020; Study on ionic liquids controlled synthesis of functionalized micro/mesoporous organic polymers and its application in chemical conversion of CO_2
6. National Natural Science Foundation of China, Grant No. 21402208, Fund: ￥250,000, 01/2015~12/2017; Study on controllable synthesis of functionalized microporous organic polymers and its catalytic activity on chemical transformation of CO_2
7. Open foundation of Key Laboratory of Renewable Energy and Gas Hydrate, Chinese Academy of Sciences, Grant No. y207k3, Fund: ￥20,000, 2012/01-2013/12; Chemical conversion of the green-house gas CO_2

- **Research interest**

1. Development of new routes for efficient fabrication of nanoporous materials (e.g. organic polymers, boron nitride) and their applications in CO_2 adsorption, photocatalytic CO_2 reduction and heterogeneous catalysis.
2. Design and utilization of functionalized ionic liquids, organic molecules, homogeneous first-row transition metals and heterogeneous metal nanoparticles in catalytic conversion of C1 building blocks, including CO_2, HCOOH, CH_3OH and so on, into value-added chemicals.

Professional skills

1. **Synthesis:** Organic synthesis and organometallic chemistry, synthesis of polymeric porous materials, metal nanoparticle materials, proficiency in the inert-atmosphere manipulation techniques, (high pressure) gas-involving manipulation, low-temperature reaction control, solid materials and organic compound characterization, purification and analysis.
2. **Equipment Operation and Data Analysis:** solid and liquid NMR, GC, GC-MS, HPLC, ESI-MS, in situ FTIR, UV-Vis, TGA, elemental analysis, TEM, SEM, XPS, XRD.
3. **Language:** Chinese (native speaker), English (fluent)
   Proficient in writing scientific publications, grant writing, preparing posters and giving oral presentations.
   Excellent ability to communicate in multicultural environment, carry out discussions and presentations.
4. **Computer:** Skilled in the operation of Chemoffice, MestReNova, Endnote, Office software and so on.
   National Computer Rank Examination Certificate II (C Programming Language).

List of Publications

- **Publications as first or corresponding author**

1. H. Chen (#), **Z. Yang** (#), H. Peng (#)*, S. Dai*, et al. *Chem* **2021**, accepted. (A bifunctional zeolitic porous liquid with incompatible lewis pairs for antagonistic cascade catalysis).
2. **Z. Yang**, S. Dai*, et al. *Green ChE* **2021**, accepted. (Challenges in engineering the structure of ionic liquids towards direct air capture of CO_2).
3. F. Okejiri, **Z. Yang***, S. Dai*, et al. *Nano Research* **2021**, DOI: 10.1007/s12274-021-3760-x (Ultrasound-driven fabrication of high-entropy alloy nanocatalysts promoted by alcoholic ionic liquids).
4. **Z. Yang***, S. Dai*, et al. *J. Membr. Sci.* **2021**, 638, 119698 (Benchmark CO_2 separation achieved by highly fluorinated nanoporous molecular sieve membranes from nonporous precursor via in situ cross-linking).
5. H. Chen, **Z. Yang***, S. Dai*, et al. *J. Am. Chem. Soc.* **2021**, 143, 8521 (Photoinduced strong metal–support interaction for enhanced catalysis).
6. H. Chen, **Z. Yang***, S. Dai*, et al. *Adv. Mater.* **2021**, 33, 2008685 (Benzene ring knitting achieved by ambient-temperature dehalogenation via mechanochemical Ullmann-type reductive coupling).
7. **Z. Yang***, S. Dai*, et al. *Chem. Mater.* **2021**, 33, 3386 (Fabrication of ionic covalent triazine framework-linked membranes via a facile sol–gel approach).
8. H. Chen, **Z. Yang***, S. Dai*, et al. *J. Mater. Chem. A* **2021**, 9, 4700 (Alkaline salt-promoted construction of hydrophilic and nitrogen deficient graphitic carbon nitride with highly improved photocatalytic efficiency).
9. X. Suo, **Z. Yang***, S. Dai*, et al. *ChemSusChem* **2021**, DOI:10.1002/cssc.202100666 (CO_2 chemisorption behavior of coordination-derived phenolate sorbents).
10. Y. Luo, **Z. Yang***, S. Dai*, et al. *Nano Research* **2021**, DOI:10.1007/s12274-021-3339-6 (Robust perfluorinated porous organic networks: Succinct synthetic strategy and application in chlorofluorocarbons adsorption.).
11. **Z. Yang**, S. Dai*, et al. *ACS Energy Lett.* **2020**, 6, 41 (Surpassing the organic cathode performance for lithium-ion batteries with robust fluorinated covalent quinazoline networks).
12. Y. Yuan, **Z. Yang***, S. Dai*, *Angew. Chem. Int. Ed.* **2020,** 59, 21935-21939 (Ambient temperature graphitization based on mechanochemical synthesis).
13. H. Chen, **Z. Yang***, S. Dai*, et al. *ACS Cent. Sci.* **2020**, 6, 1617-1627 (Sinter-resistant nanoparticle catalysts achieved by 2D boron nitride-based strong metal-support interactions: a new twist on an old story).
14. H. Chen, **Z. Yang***, C. L. Do-Thanh, S. Dai*. *ChemSusChem* **2020**, 13, 6182-6200 (What fluorine can do in CO_2 chemistry: applications from homogeneous to heterogeneous systems).
15. **Z. Yang**, S. Dai*, et al. *Chem* **2020**, *6*, 631-645 (Surpassing robeson upper limit for CO_2/N_2 separation with fluorinated carbon molecular sieve membranes).
16. **Z. Yang**, *Chem* **2020**, *6*, 541-543 (Enhanced CO_2 separation achieved by fluorinated membranes).
17. **Z. Yang**, S. Dai*, et al. *J. Am. Chem. Soc.* **2020**, *142*, 6856-6860 (Transformation strategy for highly crystalline covalent triazine frameworks: from staggered AB to eclipsed AA stacking).
18. Y. Luo, **Z. Yang***, S. Dai*, et al. *J. Mater. Chem. A* **2020**, *8*, 4740-4746 (De novo fabrication of multi-heteroatom-doped carbonaceous materials via an in situ doping strategy).
19. **Z. Yang**, S. Dai*, et al. *Angew. Chem. Int. Ed.* **2019**, 58, 13763-13767 (Topotactically from pyrylium to phosphabenzene-functionalized porous organic polymers: efficient ligands in CO_2 conversion).
20. **Z. Yang**, S. Dai*, et al. *J. Mater. Chem. A* **2019**, 7, 17277-17282 (Influence of fluorination on CO_2 adsorption in

materials derived from fluorinated covalent triazine framework precursors).

21. H. Chen, **Z. Yang***, S. Dai*, et al. *Adv. Funct. Mater.* **2019**, 1906284 (From highly purified boron nitride to boron nitride-based heterostructures: an inorganic precursor-based strategy).
22. H. Chen, **Z. Yang***, S. Dai*, et al. *Angew. Chem. Int. Ed.* **2019**, 58, 10626-10630 (A strategy for construction of a nanoporous highly crystalline hexagonal boron nitride from an amorphous precursor).
23. X. Yu (#), **Z. Yang (#)**, Z. Liu*, et al. *Angew. Chem. Int. Ed.* **2019**, 58, 632-636 (EosinY-functionalized conjugated organic polymers for visible-light driven CO_2 reduction with H_2O to CO with high efficiency).
24. Z. Liu(#), **Z. Yang (#)**, Z. Liu*, et al. *ACS Sustainable Chem. Eng.* **2019**, 7, 18236-18241 (Co-catalyzed hydrogenation of levulinic acid to γ-valerolactone under atmospheric pressure).
25. S. Che, **Z. Yang***, S. Dai*, et al. *Chem. Commun.* **2019**, 55, 13450-13453 (A succinct strategy for construction of nanoporous ionic organic networks from a pyrylium intermediate).
26. Z. Liu(#), **Z. Yang(#)**, Z. Liu*, et al. *Org. Lett.* **2018**, 20, 5130-5134 (Rhodium-catalyzed formylation of aryl halides with CO_2 and H_2).
27. X. Yu(#), **Z. Yang (#)**, Z. Liu*, et al. *Chem. Commun.* **2018**, 54, 7633-7636 (Mesoporous imine-based organic polymer: catalyst-free synthesis in water and application in CO_2 conversion).
28. Z. Liu(#), **Z. Yang(#)**, Z. Liu*, et al. *New J. Chem.* **2018**, 42, 13933-13937 (Ethanol-mediated N-formylation of amines with CO_2/H_2 over cobalt catalysts).
29. Z. Liu(#), **Z. Yang(#)**, Z. Liu*, et al. *Adv. Synth. Catal.* **2017**, 359, 4278-4283 (Efficient cobalt-catalyzed methylation of amines using methanol).
30. Z. Liu(#), **Z. Yang(#)**, Z. Liu*, et al. *Org. Lett.* **2017**, 19, 5228-5231 (Methylation of C(sp^3)–H/C(sp^2)–H bonds with methanol catalyzed by cobalt system).
31. X. Yu(#), **Z. Yang (#)**, Z. Liu*, et al. *Chem. Commun.* **2017**, 53, 5962-5965 (Ionic liquid/H_2O-mediated synthesis of mesoporous organic polymers and their application in methylation of amines).
32. **Z. Yang**, Z. Liu*, et al. *New J. Chem.* **2017**, 41, 2869-2872 (Pyridine-functionalized organic porous polymers: applications in efficient CO_2 adsorption and conversion).
33. **Z. Yang(#)**,Z. Liu(#), Z. Liu*, et al. *Chem. Commun.* **2017**, 53, 929-932 (N-doped porous carbon nanotubes: synthesis and their application in catalysis).
34. Z. Liu(#), **Z. Yang(#)**, Z. Liu*, *New J. Chem.* **2017**, 41, 51-55 (Polyurea derived from CO_2 and diamines: highly efficient catalysts for C-H arylation of benzene).
35. **Z. Yang**, Z. Liu*, et al. *ACS Catal.* **2016**, 6, 1268-1273 (Metalated mesoporous poly(triphenylphosphine) with azo functionality: efficient catalysts for CO_2 conversion).
36. **Z. Yang**, Z. Liu*, et al. *Current Opinion in Green and Sustainable Chemistry* **2016**, 1, 13-17 (Synthesis of chemicals using CO_2 as a building block under mild conditions).
37. **Z. Yang**, Z. Liu*, *Sci. Sin. Chim.* **2016**, 973-993 (Research progress on adsorption and catalytic conversion of CO_2 by functionalized microporous organic polymers).
38. **Z. Yang**, Z. Liu*, et al. *Chem. Commun.* **2015**, 51, 1271-1274 (A Tröger's base-derived microporous organic polymer: design and applications in CO_2/H_2 capture and hydrogenation of CO_2 to formic acid).
39. **Z. Yang**, Z. Liu*, et al. *Chem. Commun.* **2015**, 51, 11576-11579 (Azo-functionalized microporous organic polymers: synthesis and applications in CO_2 capture and conversion).
40. **Z. Yang**, Z. Liu*, et al. *Green Chem.* **2015**, 17, 4189-4193 ($B(C_6F_5)_3$-catalyzed methylation of amines using CO_2

as a C1 building block).

41. **Z. Yang**, Z. Liu*, et al. *RSC Adv.* **2015**, 5, 19613-19619 (Fluoro-functionalized polymeric N-heterocyclic carbene-zinc complexes: efficient catalyst for formylation and methylation of amines with CO_2 as a C1-building block).
42. **Z. Yang**, Z. Liu*, et al. *Chem. Commun.* **2014**, 50, 13910-13913 (Fluorinated microporous organic polymers: design and applications in CO_2 adsorption and conversion).
43. **Z. Yang**, Z. Liu*, et al. *Green Chem.* **2014**, 16, 3724-3728 (Fluoro-functionalized polymeric ionic liquids: highly efficient catalysts for CO_2 cycloaddition to cyclic carbonates under mild conditions).
44. **Z. Yang**, L.-N. He*, S. Dai*, et al. *Green Chem.* **2014**, *16*, 253-258 (Coordination effect-regulated CO_2 capture with an alkali metal onium salts/crown ether system).
45. **Z. Yang**, L.-N. He*, *Beilstein J. Org. Chem.* **2014**, *10*, 1959-1966 (Efficient CO_2 capture by tertiary amine-functionalized ionic liquids through Li^+-stabilized zwitterionic adduct formation).
46. **Z. Yang**, L.-N. He*, et al. *Environ. Sci. Technol.* **2013**, *47*, 1598-1605 (Highly efficient SO_2 absorption and its subsequent utilization by weak base/polyethylene glycol binary system).
47. **Z. Yang**, L.-N. He*, et al. *Energy Environ. Sci.* **2012**, *5*, 6602-6639 (Carbon dioxide utilization with C-N bond formation: carbon dioxide capture and subsequent conversion).
48. **Z. Yang**, L.-N. He*, et al. *Green Chem.* **2012**, 14, 519-527 (Highly efficient conversion of carbon dioxide catalyzed by polyethylene glycol-functionalized basic ionic liquids).
49. **Z. Yang**, L.-N. He*, et al. *Phys. Chem. Chem. Phys.* **2012**, *14*, 15832-15839 (Highly efficient SO_2 absorption/ activation and subsequent utilization by polyethylene glycol-functionalized Lewis basic ionic liquids).
50. **Z. Yang**, L.-N. He*, et al., *SpringerBriefs in Molecular Science/SpringerBriefs in Green Chemistry for Sustainability*, ISBN-10: 3642312675, **2012** (Capture and utilization of carbon dioxide with polyethylene glycol).
51. **Z. Yang**, L.-N. He*, et al. in *Kirk-Othmer Encyclopedia*: Carbon Dioxide, Chemical Fixation, John Wiley & Sons: NJ, **2012** (Catalytic fixation of carbon dioxide into fuel and chemicals).
52. **Z. Yang**, L.-N. He*, et al. in *Handbook of Ionic Liquid*: Properties, Applications and Hazards (ISBN 978-1-62100-349-6); Mun, J., and Sim, H., Ed.; Nova Science Publishers: NY, 2012, p. 227-256 (Task-specific ionic liquid-catalyzed conversion of carbon dioxide into fuel additive and value-added chemicals).
53. **Z. Yang**, L.-N. He*, et al. *Energy Environ. Sci.* **2011**, *4*, 3971-3975 (CO_2 capture and activation by superbase/polyethylene glycol and its subsequent conversion).
54. **Z. Yang**, L.-N. He*, et al. *Green Chem.* **2011**, 13, 2351-2353 (Protic onium salts-catalyzed synthesis of 5-aryl-2-oxazolidinones from aziridines and CO_2 under mild conditions).
55. **Z. Yang**, L.-N. He*, et al. *RSC Adv.* **2011**, *1*, 545-567 (CO_2 chemistry: task-specific ionic liquids for CO_2 capture/activation and subsequent conversion).
56. **Z. Yang**, L.-N. He*, et al. *Can. J. Chem.* **2011**, 89, 544-548 (NaZSM-5-catalyzed dimethyl carbonate synthesis via the transesterification of ethylene carbonate with methanol).
57. **Z. Yang**, L.-N. He*, et al. *Green Chem.* **2010**, 12, 1850-1854 (Lewis basic ionic liquids-catalyzed synthesis of 5-aryl-2-oxazolidinones from aziridines and CO_2 under solvent-free conditions).
58. **Z. Yang**, L.-N. He*, et al. *Adv. Synth. Catal.* **2010**, 352, 2233-2240 (Lewis basic ionic liquids-catalyzed conversion of carbon dioxide to cyclic carbonates).
59. **Z. Yang**, L.-N. He*, et al. *Tetrahedron Lett.* **2010**, 51, 2931-2934 (Dimethyl carbonate synthesis catalyzed by

DABCO-derived basic ionic liquids via transesterification of ethylene carbonate with methanol).

- **Other publications**

60. T. Wang, J. Fan, C. L. Do-Thanh, X. Suo. **Z. Yang**, S. Dai*, et al. *Angew. Chem. Int. Ed.* **2021**, 60, 9953 (Perovskite oxide-halide solid solutions: A platform for electrocatalysts).
61. P. Bagri, B. P. Thapaliya, **Z. Yang**, S. Dai*, et al. *Chem. Commun.* **2020**, *56*, 2783-2786 (Electrochemically induced crystallization of amorphous materials in molten $MgCl_2$: boron nitride and hard carbon).
62. Y. Zhang, G. Chen*, L. Wu, K. Liu, H. Zhong, Z. Long, M. Tong, **Z. Yang**, S. Dai*, *Chem. Commun.* **2020**, *56*, 3309-3312 (Two-in-one: construction of hydroxyl and imidazolium-bifunctionalized ionic networks in one-pot toward synergistic catalytic CO_2 fixation).
63. H. Chen, W. Lin, Z. Zhang, **Z. Yang**, S. Dai*, et al. *Chem. Sci.* **2020**, *11*, 5766-5771 (Facile benzene reduction promoted by a synergistically coupled Cu–Co–Ce ternary mixed oxide).
64. T. Wang, H. Chen, **Z. Yang**, J. Liang, S. Dai*, *J. Am. Chem. Soc.* **2020**, *142*, 4550-4554 (High-entropy perovskite fluorides: a new platform for oxygen evolution catalysis).
65. K. Jie, Y. Zhou, Q. Sun, B. Li, R. Zhao, D.-e. Jiang, W. Guo, H. Chen, **Z. Yang**, F. Huang, S. Dai*, *Nat. Commun.* **2020**, *11*, 1086 (Mechanochemical synthesis of pillar[5]quinone derived multi-microporous organic polymers for radioactive organic iodide capture and storage).
66. W. Jiang, K. Zhu, H. Li, L. Zhu, M. Hua, J. Xiao, C. Wang, **Z. Yang**, W. Zhu*, S. Dai, et al. *Chem. Eng. J.* **2020**, *394*, 124831 (Synergistic effect of dual Brønsted acidic deep eutectic solvents for oxidative desulfurization of diesel fuel).
67. Z. Ma, **Z. Yang**, Z. Liu*, et al. *Micropor. Mesopor. Mater.* **2020**, *296*, 109992 (Nitrogen-doped microporous carbon materials with uniform pore diameters: design and applications in CO_2 and H_2 adsorption).
68. H. Chen, K. Jie, C. J. Jafta, **Z. Yang**, S. Dai*, et al. *Appl. Catal. B-Environ.* **2020**, *276*, 119155 (An ultrastable heterostructured oxide catalyst based on high-entropy materials: A new strategy toward catalyst stabilization via synergistic interfacial interaction).
69. X. Yu, **Z. Yang**, Z. Liu*, et al. *Chem. Commun.* **2019**, 55, 12475-12478 (A rose bengal-functionalized porous organic polymer for carboxylative cyclization of propargyl alcohols with CO_2).
70. W. Xu, H. Chen, K. Jie*, **Z. Yang**, S. Dai*, et al. *Angew. Chem. Int. Ed.* **2019**, 58, 5018-5022 (Entropy-driven mechanochemical synthesis of polymetallic zeolitic imidazolate frameworks for CO_2 fixation).
71. Z. Ke, **Z. Yang**, Z. Liu*, et al. *Org. Lett.* **2018**, 20, 6622-6626 (Cobalt-catalyzed synthesis of unsymmetrically N,N-disubstituted formamides via reductive coupling of primary amines and aldehydes with CO_2 and H_2).
72. S. Guo, H. Zhang, Y. Chen, Z. Liu, B. Yu, Y. Zhao, **Z. Yang**, Z. Liu*, et al. *ACS Catal.* **2018**, 8, 4576-4581 (Visible-light-driven photoreduction of CO_2 to CH_4 over N,O,P-containing covalent organic polymer submicrospheres).
73. B. Yu, P. Yang, X. Gao, **Z. Yang**, Z. Liu*, et al. *Sci. China Chem.* **2018**, 61, 449-456 (Sequential protocol for C(sp)–H carboxylation with CO_2: KOtBu-catalyzed C(sp)–H silylation and KOtBu-mediated carboxylation).
74. B. Yu, P. Yang, X. Gao, **Z. Yang**, Z. Liu*, et al. *New J. Chem.* **2017**, 41, 9250-9255 (CsF-promoted carboxylation of aryl(hetaryl) terminal alkynes with atmospheric CO_2 at room temperature).

75. Z. Ke, L. Hao, X. Gao, H. Zhang, Y. Zhao, B. Yu, **Z. Yang**, Z. Liu*, et al. *Chem. - Eur. J.* **2017**, 23, 9721-9725 (Reductive coupling of CO_2, primary amine, and aldehyde at room temperature: A versatile approach to unsymmetrically N,N‐disubstituted formamides).
76. G. Ji, **Z. Yang**, Z. Liu*, et al. *Angew. Chem. Int. Ed.* **2016**, 55, 9685-9689 (Hierarchically mesoporous *o*-hydroxyazobenzene polymers: Synthesis and their applications in CO_2 capture and conversion).
77. B. Yu, **Z. Yang**, Z. Liu*, et al. *Chem. Eur. J.* **2016**, 22, 1097-1102 (An efficient and general method for formylation of aryl bromides with CO_2 and poly(methylhydrosiloxane).
78. Z. Ma, H. Zhang, **Z. Yang**, Z. Liu*, et al. *Green Chem.* **2016**, 18, 1976-1982 (Mesoporous nitrogen-doped carbons with high nitrogen contents and ultrahigh surface areas: Synthesis and applications in catalysis).
79. X. Gao, B. Yu, Q. Mei, **Z. Yang**, Z. Liu*, et al. *New J. Chem.* **2016**, 40, 8282-8287 (Atmospheric CO_2 promoted synthesis of N-containing heterocycles over $B(C_6F_5)_3$ catalyst).
80. Y. Zhao, Y. Wu, G. Yuan, L. Hao, X. Gao, **Z. Yang**, Z. Liu*, et al. *Chem.-Asian J.* **2016**, 11, 2735-2740 (Azole anion-based aprotic ionic liquids: Functional solvents for atmospheric CO_2 transformation to various heterocyclic compounds).
81. Y. Zhao, **Z. Yang**, Z. Liu*, et al. *Chem. Sci.* **2015**, 6, 2297-2301 (Task-specific ionic liquid and CO_2-cocatalysed efficient hydration of propargylic alcohols to α-hydroxy ketones).
82. H. Zhang, **Z. Yang**, Z. Liu*, et al. *Chem. Eur. J.* **2015**, 21, 14608-14613 (Hydrogen-bonding-mediated synthesis of atomically thin TiO_2 films with exposed (001) facets and applications in fast lithium insertion/extraction).
83. X. Lin, **Z. Yang**, L.-N. He, Z. Yuan*, *Green Chem.* **2015**, 17, 795-798 (Mesoporous zirconium phosphonates as efficient catalysts for chemical CO_2 fixation).
84. G. Ji, **Z. Yang**, Z. Liu*, et al. *Chem. Commun.* **2015**, 51, 7352-7355 (Synthesis of metalloporphyrin-based conjugated microporous polymer spheres directed by bipyridine-type ligands).
85. X. Gao, B. Yu, **Z. Yang**, Z. Liu*, et al. *ACS Catal.* **2015**, 5, 6648-6652 (Ionic liquid-catalyzed C–S bond construction using CO_2 as a C1 building block under mild conditions: A metal-free route to synthesis of benzothiazoles).
86. L. Hao, Y. Zhao, B. Yu, **Z. Yang**, Z. Liu*, et al. *ACS Catal.* **2015**, 5, 4989-4993 (Imidazolium-based ionic liquids catalyzed formylation of amines using carbon dioxide and phenylsilane at room temperature).
87. H. Xu, B. Yu, H. Zhang, Y. Zhao, **Z. Yang**, Z. Liu*, et al. **2015**, 51, 12212-12215 (Reductive cleavage of inert aryl C-O bonds to produce arenes).
88. Y. Zhao, B. Yu, **Z. Yang**, Z. Liu*, et al. *Angew. Chem. Int. Ed.* **2014**, 53, 5922-5925 (A protic ionic liquid catalyzes CO_2 conversion at atmospheric pressure and room temperature: Synthesis of quinazoline-2,4(1h,3h)-diones).
89. Z. Ma, H. Zhang, **Z. Yang**, Z. Liu*, et al. *J. Mater. Chem. A* **2014**, 2, 19324-19329 (Highly mesoporous carbons derived from biomass feedstocks templated with eutectic salt $ZnCl_2$/KCl).
90. Y. Zhao, B. Yu, **Z. Yang**, L.-N. He*, *RSC Adv.* **2014**, 55, 28941-28946 (Magnetic base catalysts for the chemical fixation of carbon dioxide to quinazoline-2,4(1h,3h)-diones).
91. J. Xu, H. Zhang, Y. Zhao, **Z. Yang**, Z. Liu*, et al. *Green Chem.* **2014**, 16, 4931-4935 (Heteropolyanion-based ionic liquids catalysed conversion of cellulose into formic acid without any additives).

92. Y. Li, Z. Diao, L.-N. He*, **Z. Yang**, Carbon capture with simultaneous activation and its subsequent transformation. *Advances in Inorganic Chemistry*, Vol 65, Chapter 9, Elsevier Science, **2014**, in press (Book Chapter invited by the editor).
93. R. Ma, Z. Diao, **Z. Yang**, L.-N. He*, Homogeneous Catalysis Promoted by Carbon Dioxide in Transformation and Utilization of Carbon Dioxide, Series book *Green Chemistry and Sustainable Technology* (ISSN: 2196-6982), Springer: Dordrecht Heidelberg, **2014**, pp 337-368.
94. Y. Li, L.-N. He*, Z. Diao, **Z. Yang**, Carbon Capture with Simultaneous Activation and its Subsequent Transformation, in Rudi van Eldik, Michele Aresta, editors: CO_2 Chemistry, Vol 66 (ISBN 978-0-12-420221-4), ADIOCH, Burlington: Academic Press, **2014**, pp. 289-345.
95. Y. Zhao, **Z. Yang**, L. He*, et al. *Catal. Today* **2013**, 200, 2-8 (Design of task-specific ionic liquids for catalytic conversion of CO_2 with aziridines under mild conditions).
96. Q. Song, B. Yu, A. Liu, Y. He, **Z. Yang**, L.-N. He*, et al. *RSC Adv.* **2013**, 3, 19009-19014 (PEG400-enhanced synthesis of *gem*-dichloroaziridines and *gem*-dichlorocyclopropanes via in situ generated dichlorocarbene).
97. Y. Li, L.-N. He*, A. Liu, X. Lang, **Z. Yang**, et al. *Green Chem.* **2013**, 15, 2825-2829 (In situ hydrogenation of the captured CO_2 to formate with polyethyleneimine and Rh/monophosphine system).
98. A. Liu, R. Ma, C. Song, **Z. Yang**, L.-N. He*, et al. *Angew. Chem. Int. Ed.* **2012**, 51, 11306-11310 (Equimolar CO_2 capture by N-substituted amino acid salts and subsequent conversion).
99. J. Gao, Q. Song, L.-N. He*, **Z. Yang**, et al. *Chem. Commun.* **2012**, 48, 2024-2026 (Efficient iron(III)-catalyzed three-component coupling reaction of alkyne, CH_2Cl_2 and amine to propargylamine).
100. B. Li, A. Liu, L.-N. He,* **Z. Yang**, et al. *Green Chem.* **2012**, 14, 130-135 (Iron-catalyzed selective oxidation of sulfides to sulfoxides with the polyethylene glycol/O_2 system).
101. Y. Li, J. Wang*, L. He*, **Z. Yang**, et al. *Green Chem.* **2012**, 14, 2752-2758 (Experimental and theoretical studies on imidazolium ionic liquid-promoted conversion of fructose to 5-hydroxymethylfurfural).
102. X. Dou, L.-N. He*, **Z. Yang**, *Synth. Commun.* **2012**, 42, 62-74 (Proline-catalyzed synthesis of 5-aryl-2-oxazolidinones from carbon dioxide and aziridines under solvent-free conditions).
103. J. Gao, Q. Song, L.-N. He*, C. Liu, **Z. Yang**, et al. *Tetrahedron* **2012**, 68, 3835-3842 (Preparation of polystyrene supported Lewis acidic Fe(III) ionic liquid and its application in catalytic conversion of carbon dioxide).
104. Q. Song, Y. Zhao, L.-N. He*, J. Gao, **Z. Yang**, *Current Catal.* **2012**, 1, 107-124 (Synthesis of oxazolidinones/polyurethanes from aziridines and CO_2).
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