

赵可清简历

赵可清，博士，教授。获国务院政府津贴、四川省有突出贡献优秀专家称号。四川省高校先进功能材料重点实验室主任、学术委员。有机光电功能材料省科技创新团队负责人、省教育厅科技创新团队和四川师大重点建设科研团队负责人。先后在台湾大学、德国和日本进行博士后科研工作。研究领域：有机液晶半导体材料分子设计、合成与光电性能研究。

Zhao, Ke-Qing: Professor, Dr. Born 17th August 1966, in Chongqing, China.

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Education and Scientific Research Experience

- Sept, 2002 - Aug, 2003. Postdoc research fellow, AIST, Kansai Center, Japan. Collaborator: Dr. Yo Shimizu. Research work on Discotic Liquid Crystal Materials.
- Aug. 2001 - Mar. 2002, Postdoc in TU Darmstadt, Germany. Collaborator: Prof. Dr. Wolfgang Haase. Research on Magnetic Properties of Metallomesogens.
- Mar.1998 - Jun.1999, Postdoc in National Taiwan University, Taipei, Taiwan. Collaborator: Prof. Dr. Jwu-Ting Chen. Work on Late Transition Metal Catalyzed Polymerization.
- Sept. 1994 - Dec. 1997, Ph.D. student, Chem. Depart. Sichuan University, Chengdu, China. Supervisor: Prof. Liang-Fu Zhang, work on Synthesis and Properties of Metallomesogens.
- Sept.1988 - Jul. 1991, Master Degree Student, Chem. Depart., East-China Normal University, Shanghai, China.
- Sep.1984 - Jul.1988, College Student, Chem. Depart. Sichuan Normal University, Chengdu, China.

Scientific Research Interests and Projects

- Perfluoroalkyl-chain discotic liquid crystals, oligomers, and polymers (NSFC).
- Helical polyacetylene with triphenylene discotic mesogen as the side-chain (National Natural Science Foundation, NSFC).
- Discotic columnar liquid crystals as novel organic semiconductors (NSFC).
- Liquid crystals as templates for host-guest supramolecular architectures (NSFC).
- Liquid crystalline polymer containing carbazole or fluorene as functional units (NSFC).
- Charge carrier mobility of liquid crystals measured by photocurrent time-of-flight technique (NSFC).
- Fused-thiophene lamello-columnar liquid crystals: synthesis, charge transport, and electronic devices (NSFC).

International conferences and lectures:

- International Liquid Crystal Conference (27th, ILCC 2018), Kyoto, Japan.
- International Liquid Crystal Conference (26th, ILCC 2016), Kent State University, Ohio, USA.
- 7th International Conference on Molecular Electronics, Strasbourg, France. August 24-29th

2014.

- International Liquid Crystal Conference (ILCC 2014), 25th International Liquid Crystal Conference, Trinity College Dublin, Ireland. 29th June - 4th July, 2014.
- International Liquid Crystal Conference (ILCC 2012), 24th International Liquid Crystal Conference, Mainz, Germany, 19-24 August, 2012.
- International Liquid Crystal Conference (ILCC 2010), 23rd International Liquid Crystal Conference, July 11th-16th, 2010, Krakow, Poland.
- The 4th East Asia symposium on Functional Dyes and Advanced Materials, EAS4, June 2-5, 2009, International House, Osaka, Japan.
- International Liquid Crystal Conference (ILCC 2008), 22nd International Liquid Crystal Conference, June 29-July 4, 2008, ICC Jeju, Jeju, Korea.
- International Liquid Crystal Conference (ILCC 2006), 21st International Liquid Crystal Conference, Keystone, Colorado, USA, July 2-7, 2006.

Publications

2018

1. Chun-Xia Liu, Hu Wang, Jun-Qi Du, Ke-Qing Zhao, Ping Hu, Bi-Qin Wang, Hirosato Monobe, Benoît Heinrich and Bertrand Donnio. Molecular design of benzothienobenzothiophene-cored columnar mesogens: facile synthesis, mesomorphism, and charge carrier mobility. *J. Mater. Chem. C*, 2018, 6, 4471-4478.
2. Yao Yang, Hu Wang, Hai-Feng Wang, Chun-Xia Liu, Ke-Qing Zhao, Bi-Qin Wang, Ping Hu, Hirosato Monobe, Benoît Heinrich, and Bertrand Donnio. Molecular Engineering of Mesomorphic Fluorene-Bridged Triphenylene Triads: Thermotropic Nematic/Columnar Mesophases, and p-Type Semiconducting Behavior. *Cryst. Growth Des.*, 2018, 18, 4296–4305. DOI: 10.1021/acs.cgd.8b00083

2017

- 1, Zhao, K.-Q., Du, J.-Q., Long, X.-H., Jing, M., Wang, B.-Q., Hu, P., Monobe, H., Heinrich, B., Donnio, B. Design of Janus triphenylene mesogens: Facile synthesis, mesomorphism, photoluminescence, and semiconductivity. *Dyes and Pigments*, 2017, 143, 252-260. DOI: 10.1016/j.dyepig.2017.04.048
- 2, Zhao, K.-Q., Jing, M., An, L.-L., Du, J.-Q., Wang, Y.-H., Hu, P., Wang, B.-Q., Monobe, H., Heinrich, B., Donnio, B. Facile transformation of 1-aryltriphenylenes into dibenzof[fg,op]tetracenes by intramolecular Scholl cyclodehydrogenation: synthesis, self-assembly, and charge carrier mobility of large π -extended discogens. *Journal of Materials Chemistry C*, 2017, 5, 669-682. DOI: 10.1039/c6tc04530h

2016

- 1, Zhao, K.-Q., Gao, Y., Yu, W.-H., Hu, P., Wang, B.-Q., Heinrich, B., Donnio, B. Discogens Possessing Aryl Side Groups Synthesized by Suzuki Coupling of Triphenylene Triflates and Their Self-Organization Behavior. *European Journal of Organic Chemistry*, 2016, 2802-2814. DOI: 10.1002/ejoc.201600270

2015

1, Zhao, K.-Q., An, L.-L., Zhang, X.-B., Yu, W.-H., Hu, P., Wang, B.-Q., Xu, J., Zeng, Q.-D., Monobe, H., Shimizu, Y., Heinrich, B., Donnio, B. Highly Segregated Lamello-Columnar Mesophase Organizations and Fast Charge Carrier Mobility in New Discotic Donor-Acceptor Triads. *Chemistry - A European Journal*, 2015, 21, 10379-10390. DOI: 10.1002/chem.201500889

2, Zhao, K.-Q., Bai, X.-Y., Xiao, B., Gao, Y., Hu, P., Wang, B.-Q., Zeng, Q.-D., Wang, C., Heinrich, B., Donnio, B. Star-shaped triphenylene discotic liquid crystalline oligomers and their hydrogen-bonded supramolecular complexes with simple acids. *Journal of Materials Chemistry C*, 2015, 3, 11735-11746. DOI: 10.1039/c5tc02576a.

2014

1, Yuanzhuo Li, Ke-Qing Zhao, Chun Feng, Mark R. J. Elsegood, Timothy J. Prior, Xinsen Sun and Carl Redshaw. Ethyleneglycol tungsten complexes of calix[6 and 8]arenes: synthesis, characterization and ROP of ϵ -caprolactone. *Dalton Trans.*, 2014, 43, 13612.

2, Yuanzhuo Li, Ke-Qing Zhao, Mark R. J. Elsegood, Timothy J. Prior, Xinsen Sun, Shanyan Mo and Carl Redshaw. Organoaluminium complexes of ortho-, meta-, para-anisidines: synthesis, structural studies and ROP of ϵ -caprolactone (and rac-lactide). *Catal. Sci. Technol.*, 2014, 4, 3025.

3, Jing Ma, Ke-Qing Zhao, Mark Walton, Joseph A. Wright, David L. Hughes, Mark R. J. Elsegood, Kenji Michiue, Xinsen Sun and Carl Redshaw. Tri- and tetra-dentate imine vanadyl complexes: synthesis, structure and ethylene polymerization/ring opening polymerization capability. *Dalton Trans.*, 2014, 43, 16698.

4, Jing Ma, Ke-Qing Zhao, Mark J. Walton, Joseph A. Wright, Josef W. A. Frese, Mark R. J. Elsegood, Qifeng Xing, Wen-Hua Sun and Carl Redshaw. Vanadyl complexes bearing bi-dentate phenoxyimine ligands: synthesis, structural studies and ethylene polymerization capability. *Dalton Trans.*, 2014, 43, 8300.

5, Jing Ma, Chun Feng, Shaoli Wang, Ke-Qing Zhao, Wen-Hua Sun, Carl Redshaw and Gregory A. Solan. Bi- and tri-dentate imino-based iron and cobalt pre-catalysts for ethylene oligo-/polymerization. *Inorg. Chem. Front.*, 2014, 1, 14.

6, Igor E. Soshnikov, Nina V. Semikolenova, Jing Ma, Ke-Qing Zhao, Vladimir A. Zakharov, Konstantin P. Bryliakov, Carl Redshaw, and Evgenii P. Talsi. Selective Ethylene Trimerization by Titanium Complexes Bearing Phenoxy-Imine Ligands: NMR and EPR Spectroscopic Studies of the Reaction Intermediates. *Organometallics*. 2014, DOI: 10.1021/om500017r.

7, Feng C, Tian X, Zhou J, Xiang S, Yu W, Wang B, Hu P, Redshaw C, Zhao K. A convenient tandem one-pot synthesis of donor-acceptor-type triphenylene 2,3-dicarboxylic esters from diarylacetylene. *Org. Biomol. Chem.*, 2014, 12, 6977-6981.

8, Peng Ruan, Bo Xiao, Hai-Liang Ni, Ping Hu, Bi-Qin Wang, Ke-Qing Zhao, Qing-Dao Zeng and Chen Wang. The influence of alkyl chain substitution pattern on the two- and three-dimensional self-assembly of truxenone discogens. *Liq. Cryst.* 2014, 41(8), 1152-1161.

2013

1. Wen-Hao Yu, Chao Chen, Ping Hu, Bi-Qin Wang, Carl Redshaw, Ke-Qing Zhao. Tetraphenylethene-triphenylene oligomers with an aggregation-induced emission effect and

- discotic columnar mesophase. *RSC Adv.*, 2013, **3**, 14099-14105.
2. Bin Han, Ping Hu, Bi-Qin Wang, Carl Redshaw, Ke-Qing Zhao*. Triphenylene discotic liquid crystal trimers synthesized by Co₂(CO)₈ catalyzed terminal alkyne [2+2+2] cycloaddition. *Beilstein J. Org. Chem.*, 2013, **9**, 2852.
 3. Bo Xiao, Zhao-Jun Liu, Bi-Qin Wang, Ping Hu, Carl Redshaw, Ke-Qing Zhao*. Synthesis of Triphenylene Discotic Liquid Crystals Possessing Nine Alkyl Chains: Influence of Molecular Symmetry and Chain Length on Mesomorphism. *Mol. Cryst. Liq. Cryst.* 2013, **577**, 25-35. DOI: 10.1080/15421406.2013.781489.
 4. Xue-mei Zhang, Hai-feng Wang, Shuai Wang, Yong-tao Shen, Yan-lian Yang, Ke Deng, Ke-qing Zhao, Qing-dao Zeng, and Chen Wang. Triphenylene Substituted Pyrene Derivative: Synthesis and Single Molecule Investigation. *J. Phys. Chem. C*, 2013, **117**, 307-312.
 5. Zhen-Qiang Yu, Jacky W. Y. Lam, Ke-Qing Zhao, Cai-Zhen Zhu, Shuang Yang, Jie-Sheng Lin, Bing Shi Li, Jian-Hong Liu, Er-Qiang Chen and Ben Zhong Tang. Mesogen jacketed liquid crystalline polyacetylene containing triphenylene discogen: synthesis and phase structure. *Polym. Chem.* 2013, **4**, 996-1005.
 6. Yue-Feng Bai, Long Bao, Ping Hu, Bi-Qin Wang, Carl Redshaw, Ke-Qing Zhao*. Copper-free click chemistry between azides and internal alkynes for triphenylene discotic liquid crystal trimer formation. *Liq. Cryst.* 2013, **40**, 97-105. DOI: 10.1080/02678292.2012.733034.
 7. Hai-Liang Ni, Hirosato Monobe, Ping Hu, Bi-Qin Wang, Yo Shimizu, Ke-Qing Zhao. Truxene discotic liquid crystals with two different ring substituents: synthesis, mesomorphism and high charged carrier mobility. *Liquid Crystals*, 2013, **40**, 411-420.
 8. Yue-Feng Bai, Ke-Qing Zhao, Ping Hu, Bi-Qin Wang and Carl Redshaw. Mono-Disperse Triphenylene Discotic Liquid Crystal Oligomers Synthesized by Click Chemistry. *Current Org. Chem.* 2013, **17**, 871-885.

2012

1. Chun Feng, Xin Wang, Bi-Qin Wang, Ke-Qing Zhao, Ping Hu, Zhang-Jie Shi. One stone two birds: construction of polysubstituted benzenes from the same starting material and precatalyst by switching the active sites of catalyst with different additives. *Chem. Commun.* 2012, **48**, 356-358. DOI: 10.1039/clcc15835j.
2. Li Yibao, Zhao Keqing, Yang Yanlian, Deng Ke, Zeng Qingdao, Wang Chen, Functionalization of two-component molecular networks: recongnition of Fe³⁺, *Nanoscale*, 2012, **4**, 148-151.
3. Hu Li, Ke-Han He, Jia Liu, Bi-Qin Wang, Ke-Qing Zhao, Ping Hu, Zhang-Jie Shi. Straightforward synthesis of phenanthrenes from styrenes and arenes. *Chem. Commun.* 2012, **48**, 7028-7030.

2011

- 1, H. Monobe, C. Chen, K.-Q. Zhao, P. Hu, Y. Miyake, A. Fujii, M. Ozaki, Y. Shimizu, Bipolar Carrier Transport in Tri-Substituted Octyloxy-Truxene DLC, *Mol. Cryst. Liq. Cryst.*, 2011, **545**: 149-155. DOI: 10.1080/15421406.2011.568891.
- 2, ZHAO KeQing, ZHOU Hui, YU WenHao, HU Ping, WANG BiQin, MONOBE Hirosato, SHIMIZU Yo, Synthesis of functionalized triphenylene discotic liquid crystals and the influence of unsaturated periphery on mesomorphism, *Sci. China Chem.*, 2011, **54**(10), 1576-1583.

- 3, Li Wang, Xiao-Jun Liu, Ping Huang, Qing-Ping Gong, Yong-Hong Li, Bi-Qin Wang, Ke-Qing Zhao, A New Way to Access Chiral Liquid Crystals: Organocatalyst-Mediated Synthesis of Chiral Rod-Like Liquid Crystals, *Mol. Cryst. Liq. Cryst.*, 2011, 541, 53-59. DOI: 10.1080/15421406.2011.570138
- 4, K. Q. ZHAO, J. Z. GUO, W. H. YU, L. WANG, P. HU, B. Q. WANG, H. MONOBE, AND Y. SHIMIZU, Synthesis and Mesomorphism of Asymmetric Triphenylene Discotic Liquid Crystals Bearing with Mono-Amido-Based Alkyl Soft Chains. *Mol. Cryst. Liq. Cryst.*, 2011, 542: 37-47.
- 5, YU-TING LIAO, KE-QING ZHAO, LI WANG, PING HU, AND BI-QIN WANG, Synthesis and Mesomorphism of Novel Chiral Triphenylene-Based Discotic Liquid Crystals. *Mol. Cryst. Liq. Cryst.*, 2011, 542: 75-83.
- 6, Ke-Qing Zhao, Chao Chen, Hirosato Monobe, Ping Hu, Bi-Qin Wang and Yo Shimizu. Three-chain truxene discotic liquid crystal showing high charged carrier mobility. *Chem Commun*, 2011, 47, 6290-6292.
- 7, Hong-Mei Chen; Ke-Qing Zhao; Li Wang; Ping Hu; Bi-Qin Wang, Synthesis and Mesomorphism of Triphenylene Discotic Liquid Crystals Containing Fluorinated Chains, *Soft Materials*, 2011, 9(4), 359-381.
- 8, Wang L, Gong QP, Liu XJ, Li YH, Huang P, Wang BQ and Zhao KQ, Organocatalyst-mediated Aldol Robinson Cascade Reactions: A Convenient Synthesis of Substituted Cyclohex-2-enones, *Chem. Lett*, 2011, 40(2), 138-139.

2010

- 10, Li Y, Deng K, Wu X, Lei S, Zhao K, Yang Y, Zeng Q, Wang C. Molecular arrays formed in anisotropically rearranged supramolecular network with molecular substitutional asymmetry. *J. Mater. Chem.*, 2010, 20, 9100-9103.
- 9, Y. Miyake, P. Hu, K.-Q. Zhao, H. Monobe, A. Fujii, M. Ozaki, Y. Shimizu, Carrier mobility behavior of triphenylene mesogen with a hydrogen bonding amide group, *Mol. Cryst. Liq. Cryst.* 2010, 525, 97-103.
- 8, Li Xu, Bi-Jie Li, Zhen-Hua Wu, Xing-Yu Lu, Bing-Tao Guan, Bi-Qin Wang, Ke-Qing Zhao and Zhang-Jie Shi, Nickel-Catalyzed Efficient and Practical Suzuki–Miyaura Coupling of Alkenyl and Aryl Carbamates with Aryl Boroxines, *Org. Lett.*, 2010, 12 (4), 884–887.
- 6, Li-Li Li, Ping Hu, Bi-Qin Wang, Wen-Hao Yu, Yo Shimizu and Ke-Qing Zhao, Synthesis and mesomorphism of ether–ester mixed tail C3-symmetrical truxene discotic liquid crystals, *Liquid Crystals*, 2010, 37(5), 499-506.
- 5, YU WenHao, NIE ShiChang, BAI YueFeng, JING Yang, WANG BiQin, HU Ping, ZHAO KeQing, Synthesis of disk-rod-disk liquid crystal trimers by using click chemistry, *Sci China Chem*, 2010, 53(5), 1134-1141.
- 4, Hui Zhou, Wen-Hao Yu, Bi-Qin Wang, Ping Hu and Ke-Qing Zhao, Synthesis and mesomorphism of rigid bridge triphenylene discotic liquid crystal dimmers, *Key Engineering Materials Vols. 428-429 (2010) pp 41-46.*
- 3, Yang Yang, Ke-Qing Zhao, Wen-Hao Yu, Bi-Qin Wang and Ping Hu, Synthesis and mesomorphism of semi-fluorinated chain liquid crystals with [1,2,3]-triazole rings, *Key Engineering Materials Vols. 428-429 (2010) pp 135-139.*
- 2, Qing Yan, Ping Hu, Wen-Hao Yu, Bi-Qin Wang and Ke-Qing Zhao, Synthesis and mesomorphism of 1,1'-disubstitued ferrocene liquid crystals with a schiff's base bridge, *Key Engineering Materials Vols. 428-429 (2010) pp 162-166.*

1, Wen-Hao Yu, Yue-Feng Bai, Yang Jing, Shi-Chang Nie, Bi-Qin Wang, Ping Hu and Ke-Qing Zhao, Synthesis of disk-rod-disk liquid crystal trimers by using click chemistry, *Key Engineering Materials* Vols. 428-429 (2010) pp 106-110.

2009

- 1, Y. F. Bai, K. Q. Zhao, P. Hu, B. Q. Wang, and Y. Shimizu, Synthesis of Amide Group Containing Triphenylene Derivatives as Discotic Liquid Crystals and Organic Gelators, *Mol. Cryst. Liq. Cryst.*, 2009, 509, 60-76.
- 2, K. Q. Zhao, Y. F. Bai, P. Hu, B. Q. Wang, and Y. Shimizu, Synthesis of Triphenylene Discotic Liquid Crystal Dimers: Click Chemistry As an Efficient Tool, *Mol. Cryst. Liq. Cryst.*, 2009, 509, 77-88.
- 3, YANG GaoFan, ZHAO KeQing, YU WenHao, HU Ping, WANG BiQin, Synthesis of unsymmetric triphenylene discotic liquid crystals with a semi-fluorinated chain and the influence of fluorophobic effect on mesogenic behavior. *Sci China Ser B-Chem*, 2009, 52(8), 1244-1252.
- 4, CHEN JunRong, HUANG ChuRui, XU BuYi, LI Quan, ZHAO KeQing, Theoretical study on the charge transport properties of triphenylene discogens with a phenylpropionyloxy or 3-phenylpropenyloxy side chain. *Sci China Ser B-Chem*, 2009, 52(8), 1192-1197.
- 5, Ji Hong, Zhao KeQing, Yu WenHao, Wang BiQin, Hu Ping, Synthesis and mesomorphism of diacetylene-bridged triphenylene discotic liquid crystal dimers. *Sci China Ser B-Chem*, 2009, 52(7), 975-985.
- 6, Biqin Wang, Caiyan Gao, Keqing Zhao, Ping Hu, Synthesis and mesomorphism of mixed ether-ester tail triphenylene discotic liquid crystals with long alkyloxy peripheral chains, *Front. Chem. China*, 2009, 4(2), 177-185.
- 7, Xiaojing Ma, Yibao Li, Xiaohui Qiu, Keqing Zhao, Yanlian Yang and Chen Wang, Two-dimensional rigid molecular network with elastic boundaries for constructing hybrid molecular assemblies, *J. Mater. Chem.* 2009, 19, 1490-1493.
- 8, Ma X.; Yang Y.; Wang C.; Zhao K. Molecular absorptive behavior of liquid crystal molecular templates, *J. Nanosci. Nanotechnol.* 2009, 9(2), 1148-1151.

2008

- 1, Lam JWY, Xing C, Zhao K, Tang BZ, Discotic liquid crystals: synthesis and mesomorphic properties of polyacetylenes carrying triphenylene pendant groups, *Proc. of SPIE*, 2008, 7050, 70500M. (Invited Paper)
- 2, Wang Bi-Qin, Xiang Shi-Kai, Sun Zuo-Peng, Guan Bing-Tao, Hu Ping, Zhao Ke-Qing, Shi Zhang-Jie, Benzylolation of arenes through FeCl₃-catalyzed Friedel-Crafts reaction via C-O activation of benzyl ether, *Tetrahedron Letters*, 2008, 49, 4310-4312.
- 3, Li Min, Yang Yan-Lian, Zhao Ke-Qing, Zeng Qing-Dao, Wang Chen, Bipyridine-mediated assembling characteristics of aromatic acid derivatives, *J. Phys. Chem. C* 2008, 112, 10141-10144.
- 4 Ma, X.; Yang, Y.; Deng, K.; Zeng, Q.; Zhao, K.; Wang, C.; Bai, C. Molecular miscibility characteristics of self-assembled 2D molecular architectures, *J. Mater. Chem.* 2008, 18, 2074-2081.
- 5, Xing, C.; Lam, J. W. Y.; Zhao, K.; Tang, B. Z., Synthesis and liquid crystalline properties of poly(1-alkyne)s carrying triphenylene discogens, *J. Polym. Sci. Part A: Polym. Chem.*, 2008, 46, 2960-2974.
- 6, Quan LI, Jing CAI, Jun-Rong CHEN, Ke-Qing ZHAO, Density Functional Theory Study of

Red-shifted Hydrogen Bonds of 4-Pyridinemethanol with Water, *Chin. J. Chem.* 2008, 26(2); 255-259.

7, Guan, B.-T.; Xiang, S.-K.; Wu, T.; Sun, Z.-P.; Wang, B.-Q.; Zhao, K.-Q.; Shi, Z.-J. Methylation of arenas via Ni-catalyzed aryl C-O/F activation, *Chem Commun.* 2008, 1437-1439.

8, Guan, B.-T.; Xiang, S.-K.; Wang, B.-Q.; Sun, Z.-P.; Wang, Y.; Zhao, K.-Q.; Shi, Z.-J. Direct benzylic alkylation via Ni-catalyzed selective benzylic sp³ C-O activation, *J. Am. Chem. Soc.* 2008, 130, 3268-3269.

2007

1, Ma, X.-J.; Yang, Y.-L.; Deng, K.; Zeng, Q.-D.; Wang, C.; Zhao, K.-Q.; Hu, P.; Wang, B.-Q. Identification of a peripheral substitution symmetry effect in self-assembled architectures, *ChemPhysChem*, 2007, 8, 2615-2620.

2, Wang, B. Q.; Zhao, K. Q.; Hu, P.; Yu, W. H.; Gao, C. Y.; Shimizu, Y. Tuning hydrogen-bonding with amide groups for stable columnar mesophases of triphenylene discogens, *Mol. Cryst. Liq. Cryst.* 2007, 479, 135-150.

3, Li Quan, Hu Jing-Dan, Zhao Ke-Qing, DFT study of hydrogen-bonded 1,3,5-triazine-water complexes, *Chin. J. Chem.* 2007, 25, 1078-1081.

4, Zhao Ke-Qing, Hu Ping, Wang Bi-Qin, Yu Wen-Hao, Chen, Hong-Mei, Wang Xin-Ling, Shimizu Yo, Synthesis of Mixed Tail Triphenylene Discotic Liquid Crystals: Molecular Symmetry and Oxygen-Atom Effect on the Stabilization of Columnar Mesophases, *Chin. J. Chem.* 2007, 25, 375-381.

2006

1, Zhao, K.-Q.; Wang, B.-Q.; Hu, P.; Gao, C.-Y.; Yuan, F.-J.; Li, H.-R. New triphenylene based discotic liquid crystals with mixed tails: molecular symmetry and wide columnar mesophase range, *Chin. J. Chem.* 2006, 24, 210-214.

2, FU-JIANG DING, YUN-QING HE, KE-QING ZHAO, Extrapolation of the Linear and Nonlinear Polarizabilities From Ab Initio Finite Oligomer Calculations, *International Journal of Quantum Chemistry*, 2006, 106, 1934-1942.

2005

1, ZHAO, Ke-Qing, WANG, Bi-Qin, HU, Ping, LI, Quan, ZHANG, Liang-Fu, Synthesis of New Triphenylene-containing Discotic Liquid Crystals and the Influence of Fluorophilic Effect and Molecular Symmetry on Mesomorphism, *Chin. J. Chem.*, 2005, 23, 767-774.

2004

1, Guang, W.; Han, J.; Wan, W.; Zhao, K.; Zhang, L., Synthesis and liquid crystal properties of dinuclear cyclopalladated 5-alkyl-2-(4'-alkoxyphenyl)pyrimidine and 3-(4'-alkoxyphenyl)-6-alkoxy-pyridazine complexes, *Liq. Cryst.* 2003, 30(11), 1259-1265.