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课题组网页 (English): 待更新

教育和工作经历

2018.8—至今	清华大学化工系	助理教授、博导、特别研究员
2018.1-2018.8	清华大学化工系	助理研究员
2014.11-2017.12	斯坦福大学材料系	博士后
2009.9-2014.7	清华大学化工系	博士
2005.9-2009.7	中国石油大学(北京)化学科学与工程学院	本科

研究方向

1. 纳米碳材料

研究碳纳米管、石墨烯等纳米碳材料的生长机理、控制制备、结构调控、性能测量及应用等

2. 功能材料

面向能源、催化、环保等领域,开展新型功能材料的可控制备、性能调控及应用等方面的研究

3. 材料的表面及界面现象

研究微纳尺度下材料所呈现的独特的表面/界面现象,比如超润滑现象、表面化学特性、微尺度液滴在纳米纤维上的流动等

4. 环保材料

针对日益严重的环境问题和需求,研究新型空气过滤材料和水污染处理材料等,以产生清洁的空气和水

项目课题

1. 国家自然科学基金面上项目(51872156): 超长碳纳米管管束的可控制备及其结构与力学性能关系的研究, 2019.01.01-2022.12.31
2. 清华大学教研系列教师科研启动经费: 2018.09.01-2021.08.31

学术荣誉与奖励

1. 2016, 教育部自然科学奖一等奖(排名: 5/10)
2. 2015, 瑞士Chorafas青年研究奖
3. 2014, 北京市优秀毕业生
4. 2014, 清华大学优秀毕业生
5. 2014, 清华大学优秀博士论文一等奖
6. 2014, 清华大学研究生学术新秀
7. 2013, 清华大学研究生特等奖学金
8. 2013, 中国纳米科学与技术国际会议最佳墙报奖
9. 2013, 研究生国家奖学金
10. 2013, 巴斯夫首届亚太地区科技论坛最佳墙报奖
11. 2013, 巴斯夫优秀博士生特等奖
12. 2013, 清华大学第330期博士生论坛优秀口头报告
13. 2012, 研究生国家奖学金
14. 2012, 教育部博士研究生学术新人奖,
15. 2012, 第13届纳米管科学与应用国际会议最佳墙报奖
16. 2012, 清华大学第304期博士生论坛优秀口头报告
17. 2012, 金涌奖学金
18. 2012, 首届FLOTU实验室建设贡献三等奖
19. 2011, 中日韩能源与环境纳米材料国际论坛最佳墙报奖
20. 2011, 清华大学综合优秀二等奖学金

21. 2009, 北京市优秀毕业生
22. 2008, 道达尔奖学金
23. 2007, 国家奖学金
24. 2006, 国家奖学金

论文

Google Scholar https://zz.glgoo.top/extdomains/scholar.google.com.hk/citations?hl=zh-CN&user=xKjMFzcAAAAJ&view_op=list_works&sortby=pubdate

1. Yunxiang Bai#, **Rufan Zhang**#,*, Xuan Ye#, Zhenxing Zhu, Huanhuan Xie, Boyuan Shen, Dali Cai, Bofei Liu, Chenxi Zhang, Zhao Jia, Shenli Zhang, Xide Li*, Fei Wei*. Carbon Nanotube Bundles with Tensile Strength over 80 GPa. *Nature Nanotechnology*, doi:10.1038/s41565-018-0141-z, 2018 (#contributed equally; *Corresponding author, **Cover paper**).
2. **Rufan Zhang**, Zhiyuan Ning, Yingying Zhang*, Quanshui Zheng, Qing Chen, Huanhuan Xie, Qiang Zhang, Weizhong Qian, Fei Wei*. Superlubricity in centimetres-long double-walled carbon nanotubes under ambient conditions. *Nature Nanotechnology*, 8, 912-916, 2013. (**Cover paper**)
3. **Rufan Zhang**, Yingying Zhang*, Qiang Zhang, Huanhuan Xie, Haidong Wang, Jingqi Nie, Qian Wen, Fei Wei*. Optical visualization of individual ultralong carbon nanotubes by chemical vapour deposition of titanium dioxide nanoparticles. *Nature Communications*, 4:1727, 2013.
4. **Rufan Zhang**, Yingying Zhang, Fei Wei*. Horizontally aligned carbon nanotube arrays: growth mechanism, controlled synthesis, characterization, properties and applications. *Chemical Society Reviews*, 46, 3661-3715, 2017 (**Inside back cover paper**).
5. **Rufan Zhang**, Yingying Zhang, Fei Wei*. Controlled synthesis of ultralong carbon nanotubes with perfect structures and extraordinary properties. *Accounts of Chemical Research*, 50, 179-189, 2017 (**Cover paper**).
6. Yunxiang Bai#, Shenli Zhang#, Boyuan Shen#, Zhenxing Zhu, Silei Sun, Jun Gao, Banghao Li, Yao Wang, **Rufan Zhang***, Fei Wei*. Mechanical Energy Storage Based on Carbon Nanotubes with High Energy Density and Power Density. *Advanced Materials*, 2018 (accepted).
7. **Rufan Zhang**#, Bofei Liu#, Ankun Yang#, Yangying Zhu#, Chong Liu, Guangmin Zhou, Jie Sun, Po-Chun Hsu, Wenting Zhao, Dingchang Lin, Yayuan Liu, Allen Pei, Jin Xie, Wei Chen, Jinwei Xu, Yang Jin, Tong Wu, Xuanyi Huang, Yi Cui*. In-situ investigation of the nanoscale capture and evolution of aerosols on nanofibers. *Nano Letters*, 18, 1130-1138, 2018 (#contributed equally).
8. **Rufan Zhang**, Chong Liu, Po-Chun Hsu, Chaofan Zhang, Nian Liu, Jinsong Zhang, HyeRyong Lee, Yingying Lu, Yongcai Qiu, Steven Chu, Yi Cui*. Nanofiber air filters with high temperature stability for efficient PM2.5 removal from the pollution sources. *Nano Letters*, 16, 3642-3649, 2016.
9. **Rufan Zhang**#, Zhiyuan Ning#, Ziwei Xu#, Yingying Zhang*, Huanhuan Xie, Feng Ding, Qing Chen, Qiang Zhang, Weizhong Qian, Yi Cui, Fei Wei*. Interwall friction and sliding behavior of centimeters long double-walled carbon nanotubes. *Nano Letters*, 16, 1367-1374, 2016 (#contributed equally).
10. **Rufan Zhang**, Qian Wen, Weizhong Qian, Dang Sheng Su, Qiang Zhang, Fei Wei*. Superstrong ultralong carbon nanotubes for mechanical energy storage. *Advanced Materials*, 23, 3387-3391, 2011.
11. Yunxiang Bai#, Shenli Zhang#, Boyuan Shen#, Zhenxing Zhu, Silei Sun, Jun Gao, Banghao Li, Yao Wang, **Rufan Zhang***, Fei Wei*. Mechanical Energy Storage Based on Carbon Nanotubes with High Energy Density and Power Density. *Advanced Materials*, accepted, 2018.
12. **Rufan Zhang**, Yingying Zhang*, Qiang Zhang, Huanhuan Xie, Weizhong Qian, Fei Wei*. Growth of half-meter long carbon nanotubes based on Schulz-Flory distribution. *ACS Nano*, 7, 6156-6163, 2013.
13. **Rufan Zhang**, Chong Liu, Guangmin Zhou, Jie Sun, Nian Liu, Po-Chun Hsu, Haotian Wang, Yongcai Qiu, Jie Zhao, Tong Wu, Wenting Zhao, Yi Cui*. Morphology and Property Characterization of Primary PM10 and PM2.5 Particles from Different Sources. *Nano Research*, 11, 3182-3192, 2018.
14. **Rufan Zhang**, Huanhuan Xie, Yingying Zhang*, Qiang Zhang, Yuguang Jin, Peng Li, Weizhong Qian, Fei Wei*. The reason for the low density of horizontally aligned ultralong carbon nanotube arrays. *Carbon*, 52, 232-238, 2013.
15. **Rufan Zhang**#, Zhiyuan Ning#, Yingying Zhang*, Huanhuan Xie, Qiang Zhang, Weizhong Qian, Qing Chen, Fei Wei*. Facile manipulation of individual carbon nanotubes assisted by inorganic nanoparticles. *Nanoscale*, 5, 6584-6588, 2013 (#contributed equally).
16. **Rufan Zhang**, Yingying Zhang, Huanhuan Xie, Qiang Zhang, Weizhong Qian, Fei Wei*. Controlled synthesis and property of horizontally aligned carbon nanotubes. *SCIENTIA SINICA Chimica*, 45, 979-1009, 2015. (**Cover paper**)
17. Ankun Yang, Lili Cai, **Rufan Zhang**, Jianguan Wang, Po-Chun Hsu, Hongxia Wang, Guangmin Zhou, Jinwei Xu, Yi Cui*. Thermal Management in Nanofiber-Based Face Mask. *Nano Letters*, 17, 3506-3510, 2017.
18. Guangmin Zhou#, Jie Sun#, Yang Jin, Wei Chen, Chenxi Zu, **Rufan Zhang**, Yongcai Qiu, Jie Zhao, Denys Zhuo, Yayuan Liu, Xinyong Tao, Wei Liu, Kai Yan, Hye Ryong Lee, Yi Cui*. Sulfiphilic Nickel Phosphosulfide Enabled Li2S Impregnation in 3D Graphene Cages for Li-S Batteries. *Advanced Materials*, 1603366, 2017.
19. Guangmin Zhou, Hongzhen Tian, Yang Jin, Xinyong Tao, Bofei Liu, **Rufan Zhang**, Zhi Wei She, Denys Zhuo, Yayuan Liu, Jie Sun, Jie Zhao, Chenxi Zu, David Sichen Wu, Qianfan Zhang, Yi Cui*. Catalytic oxidation of Li2S on the surface of metal sulfides for Li-S batteries. *Proceedings of the National Academy of Sciences, USA*, 114, 840-845, 2017.
20. Yang Jin, Sa Li, Akihiro Kushima, Xiaoquan Zheng, Yongming Sun, Jin Xie, Jie Sun, Weijiang Xue, Guangmin Zhou, Jiang Wu, Feifei Shi, **Rufan Zhang**, Zhi Zhu, Kangpyo So, Yi Cui*, Ju Li*. Self-healing SEI enables full-cell cycling of a silicon-majority anode with a coulombic efficiency exceeding 99.9%. *Energy & Environmental Science*, 10, 580-592, 2017.
21. Jin Xie, Lei Liao, Yongji Gong, Yanbin Li, Feifei Shi, Allen Pei, Jie Sun, **Rufan Zhang**, Biao Kong, Ram Subbaraman, Jake Christensen, Yi Cui*. Stitching h-BN by atomic layer deposition of LiF as a stable interface for lithium metal anode. *Science Advances*, 3, eao3170, 2017.
22. Yang Jin, Guangmin Zhou, Feifei Shi, Denys Zhuo, Jie Zhao, Kai Liu, Yayuan Liu, Chenxi Zu, Wei Chen, **Rufan Zhang**, Xuanyi Huang, Yi Cui*. Reactivation of dead sulfide species in lithium polysulfide flow battery for grid scale energy storage. *Nature Communications*, 8: 462, 2017.
23. Huanhuan Xie, **Rufan Zhang**, Yingying Zhang*, Zhe Yin, Muqiang Jian, Fei Wei*. Preloading catalysts in the reactor for repeated growth of horizontally aligned carbon nanotube arrays. *Carbon*, 98, 157-161, 2016.
24. Zhenxing Zhu#, Nan Wei#, Huanhuan Xie#, **Rufan Zhang**, Yunxiang Bai, Qi Wang, Chenxi Zhang, Sheng Wang, Lianmao Peng, Liming Dai, Fei Wei*. Acoustic-assisted assembly of an individual monochromatic ultralong carbon nanotube for high on-current transistors. *Science Advances*, 2, e1601572, 2016.
25. Jinwei Xu#, Chong Liu#, Po-Chun Hsu, Kai Liu, **Rufan Zhang**, Yayuan Liu, Yi Cui*. Roll-to-Roll Transfer of Electrospun Nanofiber Film for High-Efficiency Transparent Air Filter. *Nano Letters*, 16, 1270-1275, 2016.

26. Kai Liu#, Chong Liu#, Po-Chun Hsu, Jinwei Xu, Biao Kong, Tong Wu, **Rufan Zhang**, Guangmin Zhou, William Huang, Jie Sun, Yi Cui*. Core-Shell Nanofibrous Materials with High Particulate Matter Removal Efficiencies and Thermally Triggered Flame Retardant Properties. *ACS Central Science*, doi: 10.1021/acscentsci.8b00285, 2018.
27. Xiaoyuan Zhang, Weihua He, **Rufan Zhang**, Qiuying Wang, Peng Liang, Xia Huang*, Bruce E. Logan, Fellingner Tim-Patrick. High-Performance Carbon Aerogel Air Cathodes for Microbial Fuel Cells. High-Performance Carbon Aerogel Air Cathodes for Microbial Fuel Cells. *ChemSusChem*, 9, 2788-2795, 2016.
28. Yongcai Qiu#, Wei Liu#, Wei Chen#, Wei Chen#, Guangmin Zhou, Po-Chun Hsu, **Rufan Zhang**, Zheng Liang, Shoushan Fan, Yuegang Zhang*, Yi Cui*. Efficient solar-driven water splitting by nanocone BiVO₄-perovskite tandem cells. *Science Advances*, 2, e1501764, 2016.
29. Yongcai Qiu, Genlan Rong, Jie Yang, Guizhu Li, Shuo Ma, Xinliang Wang, Zhenghui Pan, Yuan Hou, Meinan Liu, Fangmin Ye, Wanfei Li, Zhi Wei Seh, Xinyong Tao, Hongbin Yao, Nian Liu, **Rufan Zhang**, Guangmin Zhou, Jiaping Wang, Shoushan Fan, Yi Cui*, Yuegang Zhang. Highly Nitridated Graphene-Li₂S Cathodes with Stable Modulated Cycles. *Advanced Energy Materials*, 5, 1501369, 2015.
30. Haidong Wang, Jinhui Liu, Xing Zhang*, **Rufan Zhang**, Fei Wei. Raman Measurement of Heat Transfer in Suspended Individual Carbon Nanotube. *Journal of Nanoscience and Nanotechnology*, 15, 2939-2943, 2015.
31. Zhiyuan Ning, Qing Chen*, Jiake Wei, **Rufan Zhang**, Linhui Ye, Xianlong Wei, Mengqi Fu, Yao Guo, Xuedong Bai, Fei Wei. Directly correlating the strain-induced electronic property change to the chirality of individual single-walled and few-walled carbon nanotubes. *Nanoscale*, 7, 13116-13124, 2015.
32. Wenlin Zhang, Huanhuan Xie, **Rufan Zhang**, Muqiang Jian, Chunya Wang, Quanshui Zheng, Fei Wei, Yingying Zhang*. Synthesis of three-dimensional carbon nanotube/graphene hybrid materials by a two-step chemical vapor deposition process. *Carbon*, 86, 358-362, 2015.
33. Huanhuan Xie, **Rufan Zhang**, Yingying Zhang*, Wenlin Zhang, Muqiang Jian, Chunya Wang, Qi Wang, Fei Wei*. Graphene/graphite sheets assisted growth of high-areal-density horizontally aligned carbon nanotubes. *Chemical Communications*, 50, 11158-11161, 2014.
34. Xilai Jia, Liqiang Zhang, **Rufan Zhang**, Yunfeng Lu and Fei Wei*. Carbon nanotube-penetrated mesoporous V₂O₅ microspheres as a high-performance cathode material for lithium-ion batteries. *RSC Advances*, 4, 21018-21022, 2014.
35. Ziwu Liu*, Qianqian Shi, **Rufan Zhang**, Quande Wang, Guojun Kang, Feng Peng*. Phosphorus-doped carbon nanotubes supported low Pt loading catalyst for the oxygen reduction reaction in acidic fuel cells. *Journal of Power Sources*, 268, 171-175, 2014.
36. R. Afrin, N. A. Shah*, **Rufan Zhang**, Fei Wei, A. S. Bhatti. Structural deformation and infrared sensor response of ultralong carbon nanotubes. *Journal of Materials Science*, 49, 7023-7030, 2014.
37. Huanhuan Xie, **Rufan Zhang**, Yingying Zhang*, Peng Li, Yuguang Jin, Fei Wei*. Growth of high-density parallel arrays of ultralong carbon nanotubes with catalysts pinned by silica nanospheres. *Carbon*, 52, 535-540, 2013.
38. Guoqing Ning*, Chenggen Xu, Xiao Zhu, **Rufan Zhang**, Weizhong Qian, Fei Wei, Zhuangjun Fan, Jinsen Gao. MgO-catalyzed growth of N-doped wrinkled carbon nanotubes. *Carbon*, 56, 38-44, 2013.
39. Yuguang Jin, Yingying Zhang*, Qiang Zhang, **Rufan Zhang**, Peng Li, Weizhong Qian, Fei Wei*. Multi-walled carbon nanotube-based carbon/carbon composites with three-dimensional network structures. *Nanoscale*, 5, 6181-6186, 2013.
40. Haidong Wang, Jinhui Liu, Xing Zhang, Tianyi Li, **Rufan Zhang**, Fei Wei*. Heat Transfer between an individual carbon nanotube and gas environment in a wide Knudsen number regime. *Journal of Nanomaterials*, 2013, 181543, 2013.
41. Haidong Wang, Jinhui Liu, Zengyuan Guo, Xing Zhang*, **Rufan Zhang**, Fei Wei, Tianyi Li. Thermal transport across the interface between a suspended single-walled carbon nanotube and air. *Nanoscale and Microscale Thermophysical Engineering*, 17, 349-365, 2013.
42. Peng Li, Yichen Zong, Yingying Zhang*, Mengmeng Yang, **Rufan Zhang**, Shuiqing Li, Fei Wei*. In-situ fabrication of CNT/quartz fiber filters for high efficiency filtration of sub-micron aerosols and high water repellency. *Nanoscale*, 5, 3367-3372, 2013.
43. Ziwu Liu, Qianqian Shi, Feng Peng*, Hongjuan Wang, **Rufan Zhang**, Hao Yu. Pt supported on phosphorus-doped carbon nanotube as an anode catalyst for direct methanol fuel cells. *Electrochemistry Communications*, 16, 73-76, 2012.
44. Jun Yan, Zhuangjun Fan, Wei Sun, Guoqing Ning, Tong Wei, Qiang Zhang, **Rufan Zhang**, Linjie Zhi, Fei Wei*. Advanced asymmetric supercapacitors based on Ni(OH)₂/graphene and porous graphene electrodes with high energy density. *Advanced Functional Materials*, 22, 2632-2641, 2012.
45. L Hao, D Cox, K Lees, JC Gallop, P See, R Clarke, TJB M Janssen, **Rufan Zhang**, Fei Wei. Fabrication and characterization of carbon nanotubes as rf interconnects. *IEEE-NANO*, Aug. 20-23, 2012.
46. Qian Wen, **Rufan Zhang**, Weizhong Qian*, Yuran Wang, Pingheng Tan, Jingqi Nie, Fei Wei*. Growing 20 cm long DWNTs/TWNTs at a rapid growth rate of 80-90 μm/s. *Chemistry of Materials*, 22, 1294-1296, 2010.

专利:

1. Yi Cui, **Rufan Zhang**, Chong Liu, Po-Chun Hsu, Steven Chu. Air filter for high-efficiency PM_{2.5} capture. **US20160166959 A1**. (PCT 专利).
2. 张如范, 魏飞, 宁志远, 张莹莹, 陈清. 一种特定壁数和直径的碳纳米管的制备方法, **ZL 201210229402.X** (中国专利授权号)
3. 张如范, 魏飞, 宁志远, 张莹莹, 陈清. 一种碳纳米管线轴及其制备方法与编织方法, **ZL 201210229357.8** (中国专利授权号)
4. 张如范, 魏飞, 张莹莹, 谢欢欢. 一种移动恒温区法制备超长碳纳米管的方法, **ZL 201210260099.X** (中国专利授权号)
5. 魏飞, 张如范, 温倩, 蹇伟中. 一种超长碳纳米管及其制备方法, **ZL 201010586433.1** (中国专利授权号)
6. 魏飞, 李鹏, 张莹莹, 张如范. 一种基于碳纳米管的空气过滤材料及制备方法, **ZL 201210031785.X** (中国专利授权号).

著作

1. **Rufan Zhang**, Yingying Zhang, Fei Wei. *Nanotube Superfiber Materials: Chapter 4: Synthesis and Properties of Ultralong Carbon Nanotubes*. Elsevier Science, Amsterdam; ISBN: 9781455778638, 87-135, 2013.
2. 张如范, 聂晶琦, 魏飞. 《碳纳米管的宏量制备技术》: 第五章: 超长碳纳米管水平阵列的宏量制备. 科学出版社, 北京. ISBN: 9787030336217, 155-212, 2012.
3. 张如范, 张强, 魏飞. 《化学工程: 从基础研究到工业应用》: 第10.8章: 碳纳米管的批量制备及应用. 化学工业出版社, 北京. ISBN: 9787122239181, 409-418, 2015.
4. 张如范. 《宏观长度结构完美的超长碳纳米管的可控制备与性质研究》. 清华大学出版社, 北京. ISBN: 97873024622002017 (In press)