



# 2018 年度重点实验室总结报告

重点实验室名称：纳米器件物理与化学教育部重点实验室

实验室主任：彭练矛

副主任：陈清 张锦

学术委员会主任：解思深

副主任：王占国 薛增泉 刘忠范

## 总结报告内容：

### 一、研究水平与贡献

实验室自成立以来得到了科技部、基金委、教育部、北京市科委和北京大学的 985、211 等各专项的支持，围绕着纳米器件物理与化学相关领域开展研究，得到了很大的发展。自 2003 年实验室验收成立至 2018 年底，共发表以实验室为单位的 SCI 论文 992 篇，论文数目平稳上升；论文的引用也逐年增加，2018 年达到 4893 次/年，如图 1 所示。2018 年发表 SCI 文章 84 篇。特别是，近几年每年都有研究成果在国际顶级刊物上发表，2018 年又有一篇论文在 Science 正刊发表。

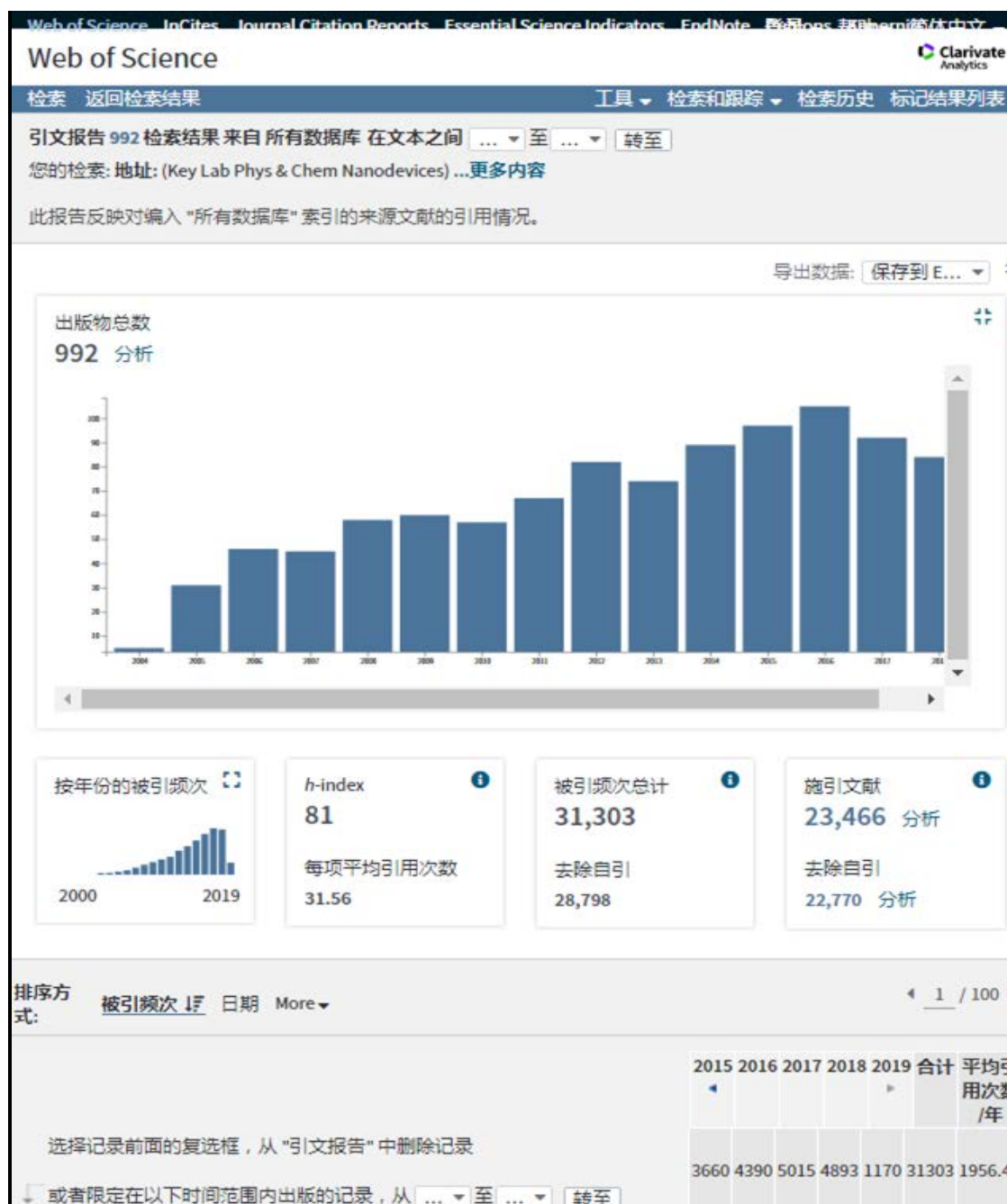
2018 年实验室再次迎来教育部的评估，通过实验室全体人员的努力，本实验室再次被评为优秀。

2018 年 11 月，本实验室的学术委员会副主任薛增泉老师去世，使我们实验室失去了一位重要的学术带头人。

### 1. 本年度新增项目和合同经费数（万元）

2018 年实验室成员承担的科研项目有 52 项，总合同经费达到 2.4 亿多元；其中 2018 和 2019 年新启动的项目有 13 项，新增合同经费 4600 余万元。

本年度彭练矛教授、张志勇教授得到了军委科技委及科委的大力资助，张锦教授申请到了国家自然科学基金重点项目。



## 2. 本年度获奖情况 (其中: 国家级奖, 省部级奖)

本年度李彦、杨烽、金钟、诸海斌、杨娟, 获得 2018 年教育部自然科学奖一等奖, 李彦老师又获得 2018 年度中国化学会-赢创化学创新奖杰出科学家奖。彭练矛老师获“何梁何利基金科学与技术进步奖”(电子信息技术奖), 入选人民论坛主持评选的“优秀海归人物 100 人”, 获第三届北京市华侨华人“京华奖”(中共北京市委、北京市人民政府)。张志勇入选第三批国家万人计划-科技创新



领军人才,获得第 15 届中国青年科技奖。还有多位老师获得北京大学的校级奖励。

还有多位老师获得北京大学的校级奖励。

实验室的学生们本年度也获得了不少奖励。张树辰获拜耳博士后奖和中国复合材料学会优秀博士论文提名奖。司徒、张诗舒和林德武获研究生国家奖学金。尹琛在 AsiaNANO 2018 国际会议上获 Nanoscale Horizons poster prize 奖。还有十余人次获得北京大学的校级奖励。

### 3. 本年度发表 SCI 论文数

本年度实验室人员发表 SCI 论文 84 篇, 其中影响因子大于 6 的杂志上的有 34 篇 (特别是影响因子大于 10 的有 20 篇, 分别是 SCIENCE 1 篇, ADVANCED MATERIALS 4 篇, JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 1 篇, ACS NANO 4 篇, ADVANCED FUNCTIONAL MATERIALS 1 篇, NANO ENERGY 3 篇, ADVANCED SCIENCE 1 篇, NATURE COMMUNICATIONS 2 篇, NANO LETTERS 2 篇, SCIENCE ADVANCES 1 篇)。

实验室骨干 2018 年在国际会议上做 1 次大会报告(Plenary talk), 做了 4 次主讲报告 (Keynote speaker), 31 次邀请报告和 29 次一般报告或墙报; 在全国性重要学术会议上做了 8 次邀请报告。

### 4. 本年度申请及授权专利数

本年度实验室有 1 项欧洲专利和 5 项中国国家发明专利申请获得授权, 新申请了 5 项中国国家发明专利。

## 二、队伍建设与人才培养

### 1. 人才队伍情况: 总人数, 其中院士、长江学者、杰出青年人数, 教授、副教授人数

到 2018 年底, 实验室共有 31 位固定人员, 有 11 名正教授、4 位特聘研究员、12 名副教授或副研究员、2 名高工、2 名助研。学术骨干中有 3 位长江特聘教授、1 位千人计划特聘教授、4 位国家杰出青年获得者、3 位青年千人、1 位中组部拔



尖人才、2 位优青、6 位教育部新世纪优秀人才、2 名北京大学百人计划特聘研究员。实验室成员在 40 多个重要学术机构中任职，特别是新增多位年青教师在各种重要学术机构中任职，体现出实验室年青人的成长和实验室成员影响力的扩大。

## 2. 人才培养情况：在站博士后、在读博士生、硕士生人数

本年度实验室现有 10 名在站博士后；有在读博士生 90 余人，在读硕士生 20 余人。



数据和成果:

一、实验室固定成员名单

序号	姓名	性别	年龄	最后学位	称号	研究方向	技术职称	在实验室工作期限
1	彭练矛	男	56	博士	长江、杰青、百千万人才	纳米电子学	教授	2003 年至今
2	张锦	男	49	博士	长江、杰青、新世纪人才	物理化学	教授	2003 年至今
3	陈清	女	53	博士	杰青、百千万人才、新世纪人才	材料物理学	教授	2003 年至今
4	徐洪起	男	62	博士	中组部千人	半导体物理学	教授	2010 年至今
5	李彦	女	52	博士	长江、杰青、新世纪人才	物理化学	教授	2003 年至今
6	侯士敏	男	48	博士	新世纪人才	物理电子学	教授	2003 年至今
7	张志勇	男	41	博士	拔尖、优青、新世纪人才	纳米电子学	教授	2008 年至今
8	张耿民	男	49	博士		物理电子学	教授	2003 年至今
9	梁学磊	男	44	博士		纳米电子学	教授	2003 年至今
10	许胜勇	男	52	博士		物理电子学	教授	2006 年至今
11	叶安培	男	58	博士		生物物理学	教授	2008 年至今
12	王永锋	男	39	博士	青千、优青	分子电子学	研究员	2012 年至今
13	魏贤龙	男	36	博士	全国优博、北大百人	物理电子学	研究员	2012 年至今
14	胡又凡	女	39	博士	青千、北大百人	纳米电子学	研究员	2014 年至今
15	孙伟	男	38	博士	青千	材料化学	研究员	2017 年至今
16	王胜	男	41	博士	新世纪人才	物理电子学	副研究员	2008 年至今
17	邢英杰	男	48	博士	全国优博	物理电子学	副教授	2008 年至今
18	申自勇	男	49	博士		物理电子学	副教授	2003 年至今
19	潘华勇	男	50	博士		电子显微学	副研究员	2004 年至今



## 纳米器件物理与化学教育部重点实验室

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20	郭等柱	男	51	博士		物理电子学	副研究员	2005 年至今
21	叶林晖	男	49	博士		计算物理学	副教授	2008 年至今
22	孙文涛	女	42	博士		物理电子学	副研究员	2008 年至今
23	廖建辉	男	42	博士		分子电子学	副教授	2008 年至今
24	戴恩光	男	54	博士		物理电子学	副研究员	2009 年至今
25	康宁	男	42	博士		量子电子学	副教授	2011 年至今
26	黄少云	男	44	博士		半导体物理学	副教授	2011 年至今
27	黄珏华	男	56	博士		微纳加工	副研究员	2014 年至今
28	丁力	男	34	博士	全国优博提名, 北京市优博	纳米电子学	助理研究员	2015 年至今
29	李娜	女	35	博士	北京大学博雅博士后	扫描探针显微学	助理研究员	2017 年至今
30	岳双林	女	42	博士		微纳加工	高级工程师	2006 年至今
31	董立军	男	44	学士		微纳加工	高级工程师	2013 年至今



## 二、实验室成员在学术机构任职情况

姓名	学术任职
彭练矛	国际物理学杂志 “Journal of Applied Physics”的副主编 国际显微学杂志 “Ultramicroscopy”编委 国际晶体学会电子衍射专业委员会顾问 中国真空学会副理事长
张锦	英国皇家化学会会士 Carbon 杂志副主编 CHEMNANOMAT 顾问编委 Chemistry of Graphene 顾问编委 化学学报和光散射学报编委 北京市低维碳材料科学与工程研究中心副主任 北京石墨烯研究院副院长
陈清	金属学报编委 中国真空学会理事 中国材料研究学会纳米材料与器件分会理事 中国仪表功能材料学会 ALD 学会委员
李彦	ACS Nano 杂志顾问编委 Nano Research 编委 Materials Horizons 顾问编委 国际碳纳米管系列学术会议指导委员会委员 中国化学会女化学工作者委员会副主任
徐洪起	Frontiers of Physics 副主编 Scientific Reports 编委 Semiconductor Science and Technology 编委 中国物理学会低温物理专业委员会委员 中国材料研究学会纳米材料与器件分会理事



侯士敏	真空科学与技术学报副主编
张耿民	中国真空学会副秘书长
叶安培	原子与分子物理学报编委 中国生物物理学会理事 中国生理学会仪器专业委员会委员
许胜勇	Nano-Micro Letters 编委
张志勇	中国电子学会青年科学家联盟会员
王永锋	物理化学学报第四届编委 中国化学快报青年编委
魏贤龙	中国计量测试学会真空计量专委会委员
胡又凡	IEEE Transactions on Nanotechnology 副主编 Nanotechnology 顾问 纳米科技咨询委员会委员
郭等柱	中国真空学会质谱分析与检漏专委会委员 北京真空学会理事
黄少云	“半导体学报”第12届编辑委员会委员 日本理化学研究所访问研究员





## 三、2018 年实验室成员承担的主要课题目录

序号	项目/课题名称	编号	负责人	起始时间	经费(万元)	类别
1.	纳米碳材料产业化关键技术及重大科学前沿	2016YFA0200104	张锦 (首席)	2016.07- 2021.06	9494	国家重点研发计划 “纳米科技”专项
2.	基于纳米碳及相关材料的新型纳米光电器件	2016YFA0201902	彭练矛 (首席)	2016.07- 2021.06	1120	国家重点研发计划 “纳米科技”专项
3.	视神经系统的信息传递	2017YFA0701302	许胜勇	2018.05- 2023.04	665	国家重点研发计划
4.	亚纳米尺度结构和相互作用的高分辨谱学研究	2017YFA0205003	魏贤龙	2017.07- 2022.06	832	国家重点研发计划
5.	纳米颗粒物物化特性测量	2017YFC0209504	叶安培	2017.07- 2020.12	372	国家重点研发计划 “大气污染成因与控制技术研究”专项
6.	高性能碳基纳米晶体管的制备及大规模集成	2016YFA0201901	张志勇	2016.08- 2021.07	960	国家重点研发计划 “纳米科技”专项
7.	芯片用碳管材料的可控和批量制备	2016YFA0201904	李彦	2016.07- 2021.06	640	国家重点研发计划 “纳米科技”专项
8.	磁性分子的自旋态操纵	2018YFA0306003	王永锋 (参加)	2018.05- 2023.04	85	国家重大科学研究计划“量子调控”专项课题
9.	基于拓扑复合小体系的原型量子器件构筑	2017YFA0303304	徐洪起 (参加)	2017.07- 2022.06	175	国家重点研发计划
10.	基于拓扑复合小体系的原型量子器件构筑	2017YFA0303304	康宁 (参加)	2017.07- 2022.06	132	国家重点研发计划
11.	单分子器件的精准制备	2017YFA02	黄少云	2017.07-	150	国家重点研发计划



	和原位高灵敏测量技术	04901	(参加)	2022.06		“纳米科技”专项
12.	外场诱导下纳米结构电子过程原位测量研究	2016YFA0200802	陈清 (参加)	2016.06- 2021.05	308	国家重点研发计划 “纳米研究”专项
13.	拓扑量子器件的制备和调控	2016YFA0300601	徐洪起 康宁 (参加)	2016.09- 2021.08	500	国家重点研发计划
14.	自旋波电子学物理、材料与器件	2016YFA0300800	黄少云 邢英杰 (参加)	2016.07- 2021.06	150	国家重点研发计划 “量子调控与量子信息”重点专项
15.	表/界面调控及光化学机制的先进表征和理论研究	2014CB239302	王永锋 (参加)	2014.01- 2018.12	138	国家重点基础研究 发展计划(973计划)
16.	纳米尺度的高性能电子与量子器件的理论与方法	61621061	彭练矛	2017.01- 2019.12	600	国家自然科学基金 创新研究群体项目
17.	高性能石墨烯器件与电路的批量制备与优化	61390504	彭练矛	2014.01- 2018.12	440	国家自然科学基金 重大项目
18.	二维电子材料及纳米量子器件的研究和原位分析仪器	61427901-002	彭练矛 (参加)	2015.01- 2019.12	800	国家自然科学基金 重大仪器项目
19.	高品质石墨炔的控制制备及其基本物性研究	21790052	张锦	2018.01- 2022.12	373	国家自然科学基金 重点项目
20.	晶元尺寸基底上单一手性单壁碳纳米管的生长	21631002	李彦	2017.01- 2021.01	291	国家自然科学基金 重点项目
21.	单层二维共价网络结构的构筑策略与性质研究	21433011	王永锋 (参加)	2015.01- 2019.12	140	国家自然科学基金 重点项目
22.	表面自组装	21522301	王永锋	2016.01-	150	国家自然科学基金 优秀青年



				2018.8		
23.	半导体纳米线纳米片量子器件研究	11874071	徐洪起	2019.01- 2022-12	64	国家自然科学基金面上项目
24.	二维材料同质和异质结构层间电学输运特性与层间转角关系的实验研究	11874068	魏贤龙	2019.01- 2022-12	63	国家自然科学基金面上项目
25.	一维无机纳米材料的三维精准组装	21875003	孙伟	2019.01- 2022.12	68	国家自然科学基金面上项目
26.	金属纳米颗粒对 MoS <sub>2</sub> 等二维半导体材料的增强光学效应及其应用研究	61775006	陈清	2018.01- 2021.12	69	国家自然科学基金面上项目
27.	包含两个相分离薄层的三元有机小分子太阳能电池研究	61774007	邢英杰	2018.01- 2021.12	63	国家自然科学基金面上项目
28.	基于石墨烯/二维超导异质结构器件的量子输运研究	11774005	康宁	2018.01- 2021.12	64	国家自然科学基金面上项目
29.	从孕妇外周血中无标记准确分离单个胎儿有核红细胞研究	U1636110	叶安培	2017.01- 2019.12	80	国家自然科学基金面上项目
30.	碳纳米管数模混合集成电路研究	61671020	丁力	2017.01- 2020.12	58	国家自然科学基金面上项目
31.	电子-分子振动相互作用对分子器件稳定性和电学性质影响理论研究	61671021	侯士敏	2017.01- 2020.12	62	国家自然科学基金面上项目
32.	“锂掺杂氧化锌铁电纳米材料的制备及其在光伏领域的应用”	61671022	张耿民	2017.01- 2020.12	60	国家自然科学基金面上项目



33.	基于等动量加速与场发射电子源的空间用微型飞行时间质谱计研究	61671023	郭等柱	2017.01-2020.12	60	国家自然科学基金面上项目
34.	高性能碳基瞬态电子器件和集成电路	61571016	胡又凡	2016.01-2019.12	76.8	国家自然科学基金面上项目
35.	单分子自旋电子器件的构建和输运性质测量	21573014	廖建辉	2016.01-2019.12	80	国家自然科学基金面上项目
36.	高性能碳基瞬态电子器件和集成电路	61571016	黄少云	2016.01-2019.12	76.8	国家自然科学基金面上项目
37.	亚 20 纳米碳纳米管 CMOS 器件研究	61376126	张志勇	2014.01-2018.12	82	国家自然科学基金面上项目
38.	扫描近场光谱新技术及其在纳米碳材料结构与性能表征中的应用	51720105003	张锦	2018.01-2022.12	229	国家自然科学基金海外合作项目
39.	中墨纳米材料双边会	2171101315	李彦	2017.08-2019.08	3	国家自然科学基金国际合作交流项目
40.	铜、铁和钴催化生长碳纳米管的 XAFS 研究	U1632119	李彦	2017.01-2019.12	52	国家自然科学基金联合基金项目
41.	三维碳基集成电路工艺研发	D171100006617001	张志勇	2018.01-2019.12	1100	北京市科委重点研发计划
42.	碳纳米管薄膜晶体管中试工艺研究	Z171100002017001	梁学磊	2017.01-2018.12.	100	北京市科委科技计划
43.	二维有机杂化金属卤化物光电功能材料研究	Z171100002017003	孙文涛	2017.01-2018.12.	90	北京市科技专项课题
44.	半导体多量子点器件研究	Z171100002217093	徐洪起	2017.05-2018.05	50	北京市科委科技计划 2017 年度创新基地培育与发展专项



## 纳米器件物理与化学教育部重点实验室

KEY LAB. FOR THE PHYSICS & CHEMISTRY OF NANODEVICES

45.	基 20170451 集成电路和芯片用高纯度单壁碳纳米管制备关键技术研究	JCYJ20170817113121505	李彦	2018.02-2021.01	200	深圳市科技计划基础研究(学科布局)
46.	保密	保密	张志勇	2018.06-2020.12	1580	军委科技委项目(密级:保密)
47.	高速碳基电子器件	17-H863-04-ZT-002-005-01	彭练矛	2017.06-2018.04	800	军委科技委项目(密级:公开)
48.	纳米-射频应用的碳纳米管器件及电路	HT14180811J0023	丁力	2017.01-2019.12	240	军委装发项目(密级:公开)
49.	保密	保密	王胜	2017.01-2020.12	185	军口预研项目(密级:保密)
50.	高温阈值机理研究		许胜勇	2017.06-2018.06	5	横向项目
51.	场发射电子源模块研制		郭等柱	2017.06-2018.06	13	横向项目
52.	一种微型原子气室封装工艺方法		郭等住	2016.05-2018.04	30	横向项目



四、2017 年实验室发表的高影响因子论文的刊物分布（影响因子大于 6 的）

刊物	篇数
SCIENCE (IF41.058)	1
ADVANCED MATERIALS (IF21.95)	4
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY (IF14.357)	1
ACS NANO (IF13.709)	4
ADVANCED FUNCTIONAL MATERIALS(IF13.353)	1
NANO ENERGY (IF13.12)	3
ADVANCED SCIENCE (IF12.441)	1
NATURE COMMUNICATIONS (IF12.353)	2
NANO LETTERS (IF12.08)	2
SCIENCE ADVANCES(IF11.511)	1
JOURNAL OF MATERIALS CHEMISTRY A (IF9.931)	1
SMALL(IF9.598)	1
BIOSENSORS & BIOELECTRONICS(IF8.173)	1
NANO RESEARCH(IF7.994)	4
NANOSCALE(IF7.223)	6
CHEMICAL COMMUNICATIONS(IF6.29)	1



## 五、主要研究成果目录

### (一)2018 年 SCI 论文目录

1. Chenguang Qiu, Fei Liu, Lin Xu, Bing Deng, Mengmeng Xiao, Jia Si, Li Lin, Zhiyong Zhang, Jian Wang, Hong Guo, Hailin Peng, Lian-Mao Peng, “Dirac-source field-effect transistors as energy-efficient, high-performance electronic switches”, **SCIENCE**, 2018, 361 (6400): 387-391
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(二) 邀请报告

1. Lian-Mao Peng, “Carbon nanotube based TFT and optoelectronic devices”, **Low Dimensional Materials for Optoelectronics plenary**, Shengzhen China, Oct. 25-28, 2018 (**Plenary Talk**)
2. Lian-Mao Peng, “CNT based thin film and flexible transistor technologies”, **14th International Conference on Nanostructured Materials**, City University of Hong Kong, Jun. 24-29, 2018 (**Keynote Speaker**)
3. Lian-Mao Peng, “Carbon Nanotube based High Performance CMOS Devices and Integrated Systems”, **19th International Conference on the Science and Application of Nanotubes and Low-dimensional Materials**, Peking University China, Jul. 15-20, 2018 (**Keynote Speaker**)
4. Youfan Hu and Lian-Mao Peng, “Wearable Smart Sensor System for Human Body Monitoring”, **the 11th Textile Bioengineering and Informatics Symposium**, Manchester UK, Jul. 25-28, 2018 (**Keynote Speaker, Session Chair**)
5. S. Y. Xu and J. J. Xu, “Impact of nanoscale events on neural functions of lives”, **2nd World Congress on Nano Science and Nano Technology**, Osaka Japan, Aug. 10-11, 2018 (**Keynote Speaker**)
6. Lian-Mao Peng, “Carbon nanotube based electronic and optoelectronic devices”, **32nd International Winterschool on Electronic Properties of Novel Materials**, Kirchberg Tirol Austria, Mar. 17-24, 2018 (**Invited Talk**)
7. Lian-Mao Peng, “Carbon nanotube film-based CMOS and optoelectronic devices and integrated systems”, **DATE2018: Design Automation and Test in Europe**, International Congress Center Dresden Germany, Mar. 19-23, 2018 (**Invited Talk**)



8. Lian-Mao Peng, “Working with Weak Mechanical Energy for Self-powered Systems”, **The 4th International Conference on Nanogenerators and Piezotronics**, Seoul Korea, May. 8-11, 2018 (**Invited Talk**)
9. Lian-Mao Peng, “Carbon nanotube electronics: towards fundamental limits and large-scale integration”, **NANOTECH 2018: Conference & Expo**, Anaheim CA USA, May. 13-18, 2018 (**Invited Talk**)
10. Lian-Mao Peng, “CNT CMOS transistors with 5nm gate length”, **14th Cross-Strait Workshop on Nano Science and Technology**, Macao, Jun. 21-24 2018 (**Invited Talk**)
11. Lian-Mao Peng, “CNT based high performance CMOS and optoelectronic devices and integrated systems”, **International Conference on Solid State Devices and Materials (SSDM2018)**, Tokyo Japan, Sep. 9-13, 2018 (**Invited Talk**)
12. Youfan Hu and Lian-Mao Peng, “High-Performance Carbon Nanotube Based Flexible Electronics for Integrated Smart Sensor System”, **the 233rd Electrochemical Society (ECS) Meeting**, Seattle USA, May. 13-17, 2018 (**Invited Talk, Session Chair**)
13. Youfan Hu and Lian-Mao Peng, “High-Performance Carbon Nanotube Based Flexible Electronics for Integrated Smart Sensor System”, **Advanced Optical Manufacturing and Testing Technologies 2018**, Chengdu China, Jun. 26-29, 2018 (**Invited Talk, Session Chair**)
14. Youfan Hu and Lian-Mao Peng, “Carbon Nanotubes for High-Performance Flexible Electronics and Integrated Smart Sensor System”, **the 19th International Conference on the Science and Application of Nanotubes and Low-dimensional Materials**, Beijing China, Jul. 15-20, 2018 (**Invited Talk, Session Chair**)
15. Youfan Hu and Lian-Mao Peng, “Carbon Nanotubes for High-Performance Flexible Electronics and Integrated Smart Sensor System”, **the First International Conference on 4D Materials and Systems (4DMS)**, Yonezawa



- Japan, Aug. 26-30, 2018 (**Invited Talk, Session Chair**)
16. Youfan Hu and Lian-Mao Peng, “Carbon Nanotubes for High-Performance Flexible Electronics and Integrated Smart Sensor System”, **International symposium on “Low Dimensional Materials for Optoelectronics” (LDMO2018)**, Shenzhen China, Oct. 25-28, 2018 (**Invited Talk**)
  17. Q. Chen and W. Yang, “InAs Nanowire Field Effect Transistors with Partial Gate”, **the AiMES 2018 Meeting, G03-SiGe, Ge, and Related Compounds: Materials Processing and Devices**, Cancun Mexico, Sep. 30-Oct 4, 2018 (**Invited Talk**)
  18. Q. Chen, “In-situ characterizing low-dimensional nanomaterials for nanodevice” , **AsiaNANO 2018**, Qingdao China, Oct. 18-21, 2018 (**Invited Talk**)
  19. Xianlong Wei, “SEM as a Versatile Lab for in-situ Nanomaterial Research”, **Asian Conference on Nanoscience and Nanotechnology 2018 (AsiaNANO 2018)**, Qingdao China, Oct. 18-21, 2018 (**Invited Talk**)
  20. Jin Zhang, “Grand Challenges and Solutions in 2D Materials Science and Technologies, Chirality Predicted Growth of Singled-walled Carbon Nanotubes Array ”, **UK-China Conference**, UK, Jan. 24 -26, 2018 (**Invited Talk**)
  21. Jin Zhang, “Chirality Predicted Growth of Singled-walled Carbon Nanotubes Array”, **Chemistry Seminar and Exchange between Taiwan University and Peking University**, Taiwan China, Apr. 19 -22, 2018 (**Invited Talk**)
  22. Jin Zhang, “Chirality Predicted Growth of Singled-walled Carbon Nanotubes Array”, **14th Cross-Strait Workshop on “Nano Science and Technology” (CSWNST14)**, Macao China, Jun. 21 -24, 2018 (**Invited Talk**)
  23. Jin Zhang, “Graphdiyne: A new member of carbon family”, **Graphene 2018**, Dresdner Germany, Jul. 26 -29, 2018 (**Invited Talk**)
  24. Jin Zhang, “Graphdiyne: A new member of carbon family”, **7th Workshop on Nanocarbon Photonics and Optoelectronics (NPO2018)**, Finland, Aug. 6-11, 2018 (**Invited Talk**)



25. Jin Zhang, “Growth of single-walled carbon nanotubes array with chirality controlled”, **29th International Conference on Diamond and Carbon Materials**, Croatia Dubrovnik, Sep. 2-6, 2018 (**Invited Talk**)
26. Jin Zhang, “Growth of Single-walled Carbon Nanotubes Array with Controlled Structure”, **ISGAM**, Lanzhou, Sep. 10-13, 2018 (**Invited Talk**)
27. Jin Zhang, “CVD Growth of Single-walled Carbon Nanotubes Array with Controlled Structure”, **The 2nd International Conference on Advanced Functional Materials & Interfaces (AFMI 2018)**, Wuhan China, Nov. 1-5, 2018 (**Invited Talk**)
28. Jin Zhang, “Growth of Single-Walled Carbon Nanotubes with Controlled Structure”, **2018 MRS Fall Meeting&Exhibit**, Boston, Nov. 25-30, 2018 (**Invited Talk**)
29. Yan Li, “Controlled Crystal Growth of Organic-Inorganic Hybrid Lead Halide Perovskite”, **The 246th GMSI Open Seminar/ The 69th CIAiS Seminar**, The University of Tokyo Japan, Feb.7, 2018 (**Invited Talk**)
30. Yan Li, “Manipulating Crystallization and Assembly of Nanomaterials via Fluidic Engineering”, **The 54th Fullerenes, Nanotubes and Graphene Symposium**, The University of Tokyo Japan, Mar. 9-12, 2018 (**Invited Talk**)
31. Yan Li, “Structure Characterization of Catalysts and Single-Walled Carbon Nanotubes in Chirality-Specified Synthesis”, **International Winterschool on Electronic Properties of Novel Materials**, Kirchberg Tiro Austria, Mar. 23, 2018 (**Invited Talk**)
32. Yan Li, “Structure Characterization of Tungsten-Based Intermetallic Compound Catalysts and Single-Walled Carbon Nanotubes”, **The 233th ECS Meeting**, Seattle USA, May. 13-17, 2018 (**Invited Talk**)
33. Xuelei Liang, “Large area and highly uniform carbon nanotube film for high performance thin film transistors”, **International conference on display technology**, Guangzhou, Apr. 9-12, 2018 (**Invited Talk**)
34. Xuelei Liang, “Carbon Nanotube Transistors for Flat Panel Display Application”,



- Americas international meeting on electrochemistry and solid state science 2018, Cancun Mexico, Sep. 30-Oct. 4, 2018 (Invited Talk)
35. Xueleli Liang, “Fabrication and performance optimization of carbon nanotube thin film transistor”, **9th International Conference on Computer Aided Design for Thin-Film Transistor Technologies (CAD-TFT)**, Shenzhen, Nov. 16-18, 2018 (Invited Talk)
36. S. Y. Xu, “Direct measurement of the local temperature increment for individual live cells”, **Nanotech and Nanobiotechnology 2018**, Paris, Jul. 12-13, 2018 (Invited Talk)
37. 李彦, “基于界面和流体力学调控的材料组装”, **中国化学会 2018 年中西部地区无机化学化工学术研讨会**, 华中师范大学 武汉, 4 月 19-22 日, 2018 (邀请报告)
38. 李彦, “单壁碳纳米管选择性生长机制的研究”, **中国化学会第 31 届学术年会**, 杭州, 5 月 5-8 日, 2018 (邀请报告)
39. 魏贤龙, “氧化硅表面隧穿电子源”, **中国真空学会 2018 学术年会**, 长春, 8 月 17-18 日, 2018 (邀请报告) 魏贤龙, “氧化硅表面隧穿电子源”, **中国电子学会真空电子学分会第 21 届学术年会**, 甘肃平凉, 8 月 23-25 日, 2018 (邀请报告)
40. 孙伟, “核酸引导的高精准度纳米加工”, **2018 年中国化学会年会**, 杭州, 5 月 5-8 日, 2018 (邀请报告)
41. 孙伟, “核酸引导的高精准度纳米加工”, **先进传感与信息技术前沿进展研讨会**, 湘潭, 11 月 17-18 日, 2018 (邀请报告)
42. 郭等柱, “质谱仪漫谈”, **北京市真空计量检测工程技术研究中心第二届学术会议**, 北京, 7 月 30-31 日, 2018 (特邀报告)。
43. 郭等柱, “便携式飞行时间质谱仪关键技术与产业化”, **2018 年中国真空年会暨产业论坛**, 浙江嘉兴, 11 月 26-27 日, 2018 (特邀报告)。

### (三) 国际会议一般报告和墙报

1. Feng Yang, “Chirality-Specific Growth of SWNTs using Intermetallic W<sub>6</sub>Co<sub>7</sub>



- Catalysts”, **The 54th Fullerenes-Nanotubes-Graphene General Symposium**, The University of Tokyo Japan, Mar. 9-12, 2018 (**Oral Presentation**)
2. Feng Yang, “In Situ Study on Catalyst for Controlled Growth of Carbon Nanotubes”, **19th International Conference on the Science and Application of Nanotubes and Related Nanomaterials (NT18)**, China, Jul. 15-20, 2018 (**Oral Presentation**)
  3. Feng Yang, “In situ on catalyst and controlled growth mechanism of carbon nanotubes”, **55th Fullerene-Nanotube-Graphene General Symposium**, Tohoku University Japan, Sep. 20, 2018 (**Oral Presentation**)
  4. Feng Yang, “XAFS study on controlled growth mechanism of carbon nanotubes”, **8th Conference of Synchrotron Facility Annual Meeting**, Xi’an China, Sep.21-22, 2018 (**Oral Presentation**)
  5. J. J. Xu and S. Y. Xu, “Waveguides Made of Soft Matter: Structure, Characteristics and Application in Lives”, **APS march Meeting**, Los Angeles USA, Mar. 5-9, 2018 (**Oral Presentation**)
  6. J. J. Xu and S. Y. Xu, “Three Vital Roles of Membrane in Electrical Communication in Lives”, **APS march Meeting**, Los Angeles USA, Mar. 5-9, 2018 (**Oral Presentation**)
  7. S. Y. Xu and J. J. Xu, “A Memory Mechanism Based on Two Dimensional Code of Neurosome Pattern”, **International Conference on Biological Information and Biomedical Engineering (BIBE 2018)**, Shanghai, Jul. 6-8, 2018 (**Oral Presentation**)
  8. S. Y. Xu and J. J. Xu, “The roles of nanomaterials in electrical communication, neural connection and brain function of biosystems”, **International Conference on nanoscience & Nanotechnology 2018**, Paris, Jul. 16-18, 2018 (**Oral Presentation**)
  9. Yangyong Sun, “Snowing Graphene using Microwave Ovens”, **The 29th International Conference on Diamond and Carbon Materials**, Dubrovnik Croatia, Sep. 2-6, 2018 (**Oral Presentation**)



10. B. Tang, M. Sun, F. J. Lv, J. H. Liao, Q. Chen, “Broadband Photodetectors Made from Few-layer In<sub>2</sub>Se<sub>3</sub> Nanosheets”, **Low Dimensional Materials for Optoelectronics (LDMO) 2018**, Shenzhen China, Oct. 25-28, 2018 (**Oral Presentation**)
11. Youfan Hu, “High-Performance Flexible Carbon Nanotube Complementary Electronics for Integrated Sensor Systems”, **MRS Fall Meeting**, Boston USA, Nov. 25-30, 2018 (**Oral Presentation**)
12. Q. Chen and M. Sun, “In situ study of electron beam induced InAs nanowires dissolution in de-ionized water by liquid cell transmission electron microscopy”, **the 19th International Microscopy Congress (IMC19)**, Sydney Australia, Sep. 9-14, 2018 (**Mini Oral Presentation presentation + digital poster**)
13. Feng Yang, “Synergetic Role of Co<sub>3</sub>C in Co-Catalyzed Growth of Carbon Nanotubes Revealed by Environmental TEM”, **19th International Conference on the Science and Application of Nanotubes and Related Nanomaterials (NT18)**, China, Jul. 15-20, 2018 (**Poster**)
14. Feng Yang, “Study on Mechanism of Structure-Controlled Growth of Carbon Nanotubes”, **19th International Conference on the Science and Application of Nanotubes and Related Nanomaterials (NT18)**, China, Jul. 15-20, 2018 (**Poster**)
15. Feng Yang, “Chirality Identification and Quantification of Carbon Nanotubes on Substrates”, **19th International Conference on the Science and Application of Nanotubes and Related Nanomaterials (NT18)**, China, Jul. 15-20, 2018 (**Poster**)
16. Feng Yang, “In situ on catalyst and controlled growth mechanism of carbon nanotubes”, **9th A3 Symposium on Emerging Materials**, Kyoto University Japan, Oct. 25-28, 2018 (**Poster**)
17. Dewu Lin, “Microwave-assisted Regeneration of Single-walled Carbon Nanotubes from Carbon Fragments”, **19th International Conference on the Science and Application of Nanotubes and Low-dimensional Materials**





- (NT18), Beijing, Jul. 18-21, 2018 (Poster)
18. Dewu Lin, “Microwave-assisted Regeneration of Single-walled Carbon Nanotubes from Carbon Fragments”, **29th International Conference on Diamond and Carbon Materials 2018**, Dubrovnic Croatia, Sep. 2-6, 2018 (Poster)
  19. Shuchen Zhang, “Mechanism of Growth of Single-Walled Carbon Nanotubes with Specific Chirality on Designed Solid Catalysts”, **13th Sino-US Forum on Nanoscale Science and Technology**, Chengdu China, Jun. 29-Jul. 3, 2018 (Poster)
  20. Shuchen Zhang, “Kinetic mechanism to enriched growth of (n, n-1) tubes”, **29th International Conference on Diamond and Carbon Materials 2018**, Dubrovnic Croatia, Sep. 2-6, 2018 (Poster)
  21. Zequn Wang, “Increasing the Density of Single-walled Carbon Nanotube Arrays by Multiple Catalysts Reactivation”, **19th International Conference on the Science and Application of Nanotubes and Low-dimensional Materials (NT18)**, Beijing, Jul. 18-21, 2018 (Poster)
  22. Zequn Wang, “Structure-Controlled Growth of Single-Walled Carbon Nanotube Arrays Using Gas-phase Etching”, **Nanomaterials for Electronics, Energy and Environment**, Kyoto Japan, Oct. 29-31, 2018 (Poster)
  23. Shishu Zhang, “Anomalous Polarized Raman Scattering and Large Circular Intensity Differential in Layered Triclinic ReS<sub>2</sub>”, **The 26th International Conference on Raman Spectroscopy**, Jeju Korea, Aug. 26-31, 2018 (Poster)
  24. Jiaqiang Li, “Diatomite-templated synthesis of free-standing three-dimensional graphdiyne for energy storage and catalysis application”, **29th International Conference on Diamond and Carbon Materials**, Dubrovnic Croatia, Sep. 2-6, 2018 (Poster)
  25. M. Sun, B. C. Yu, Z. H. Li, Q. Chen, “Impact of Electron Beam on The Dissolution of InAs Nanowires in Radiolytic Water”, **AsiaNANO 2018**, Qingdao China, Oct. 18-21, 2018 (Poster)



26. Chen Yin, “Rapid Synthesis of Ultrathin Graphdiyne Film at a Microwave Induced-Temperature Gradient Solid/Liquid Interface”, **Asian Conference on Nanoscience and Nanotechnology 2018**, Qingdao China, Oct. 18-21, 2018 (Poster)
27. Rui Feng, “Advanced 2D Materials and Applications”, **Asia Nano 2018**, Qingdao China, Oct. 18-22, 2018 (Poster)
28. Xinzhe Wang, Pan Dong, Mei Sun, Bin Tang, Yuxiang Han, Qing Chen, “GaAsSb/InAs core-shell nanowire photodetector”, **Low Dimensional Materials for Optoelectronics (LDMO) 2018**, Shenzhen China, Oct. 25-28, 2018 (Poster)
29. Liangwei Yang, “In-situ Synthesis of Graphene/TiO<sub>2</sub> Nanocomposites via Microwave Oven as Anode Materials for Li-ion Batteries”, **9th A3 Symposium on Emerging Materials**, Kyoto Japan, Oct. 29-31, 2018 (Poster)

#### (四) 专利

##### 2018 年度授权专利

专利号	专利名称	发明人	授权日期
European Patent 2873457	Catalyst for preparing chiral selective and conductive selective single-walled carbon nanotube	Yan Li, Feng Yang, Fei Peng, Juan Yang	2018-05-16
201510053863.X	一种测量有机半导体异质结物理特性的方法及系统	邢英杰	2018-09
201610300708.8	基于多步掠射角沉积法的铋化铟纳米线制备与锰掺杂方法	邢英杰	2018-08
ZL201410594398.6	一种高密度半导体性单壁碳纳米管水平阵列及其制备方法	张锦、康黎星、胡悦、赵秋辰、张树辰	2018
ZL201410594882.9	单壁碳纳米管水平阵列及其制备方法与应用	张锦、康黎星、胡悦、张树辰、赵秋辰	2018
ZL201721318338.7	生产石墨烯粉体的设备	张锦, 杨良伟, 孙阳勇, 刘海舟,	2018



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**2018 年度申请专利**

申请号	专利名称	申请人
201811337976.2	一种双金属微运动的平衡结构	戴恩光
201810734542.X	一种将视觉信息转化成触觉时域编码的头盔装置及方法	徐晶晶, 许胜勇, 葛松, 戴如君
201811340399.2	一种片上微型电子源及其制造方法	魏贤龙、杨威
201821854867.3	一种片上微型电子源	魏贤龙、杨威
201811339577.X	一种片上微型 X 射线源及其制造方法	魏贤龙



## 重要 SCI 文章首页