

一. 服装设计虚拟仿真实验教学中心主任 教学科研成果

1. 主持的教改项目
2. 教改论文
3. 主持的科研项目
4. 科研论文
5. 获奖情况
6. 获专利情况

1.主持的教改项目

序号	项目名称	项目来源级别	项目级别	项目起止时间		项目金额 (万元)
				起	止	
1	国家级服装实验教学示范中心	国家教育部	国家级	2009.12	2014.12	100
2	国家特色专业建设点服装设计与工程	国家教育部	国家级	2009.10	2012.10	80
3	国家精品课程《成衣工艺学》	国家教育部	国家级	2007.08	2012.08	20
4	国家“十一五”规划教材《成衣工艺学》	国家教育部	国家级	2007.12	2010.12	2
5	浙江省重点建设专业服装设计与工程	浙江省教育厅	省部级	2008.03		30
6	浙江省十二五优势本科专业服装设计与工程	浙江省教育厅	省部级	2012.03	2017.03	150
7	浙江省重点教材《成衣工艺学》	浙江省教育厅	省部级	2010.12	2011.12	4
8	浙江省精品课程《成衣工艺学》	浙江省教育厅	省部级	2003.11	2007.07	7
9	浙江省服装工程技术研究中心	浙江省科技厅	省部级	2011.04	2013.12	300

2.教改论文

序号	论文题目	刊物（出版社）名称、刊号	类（级）别	卷（期）数	发表时间
1	服装设计与工程网络辅助教学的设计与应用	纺织教育	二级	2009年 第01期	2009.02
2	国家级服装实验教学示范中心建设的创新思路	实验技术与管理	二级	第27卷 第12期	2010.12
3	服装实验教学中 CDIO 模式的借鉴与融合	实验室研究与探索	二级	2012年 第07期	2012.07

3.主持的科研项目

序号	项目名称	项目来源级别	项目级别	项目时间		项目金额 (万元)
				起	止	
1	先进功能性纤维材料及纺织服装高质化技术联合研发子项目——高品质服装加工关键技术	国家科技部， 国际科技合作与交流项目	省部级	2012		35/80
2	抗菌丝绸产品设计与关键技术研究	国家商务部	省部级	2012	2013	100
3	数字化服装生产技术研究及应用	国家商务部 国家茧丝绸专项发展基金	省部级	2011.11	2012.12	80
4	面向顾客的数字服装虚拟试衣系统关键技术研发	浙江省科技厅	省部级	2012		15
5	基于个性化人体特征的三维服装虚拟试衣关键问题研究	浙江省自然科学基金	省部级	2011.01	2013.12	8

6	数字化服装技术创新团队	浙江理工大学科研创新团队	校级	2013		30
7	自动人腿参数测量系统研发	绍兴振德医用敷料有限公司	横向	2010.08	2012.06	25

4. 科研论文

序号	论文题目	刊物（出版社）名称、刊号	类（级）别	卷（期）数	发表时间
1	青年女子体型特征指标及岭回归预测研究	纺织学报	一级	27(4)	2006.04
2	Application of Neural network to Identification of Young females' Body type	IEEE International Conference on Systems, Man and Cybernetics	EI 检索	Volume 3	2006.10
3	基于 C/S 模式的女子体型识别及应用	纺织学报	一级	29(6)	2008.06
4	智能服装的设计和研发	装饰	一级	2008 年 01 期	2008.01
5	Study on Automatic Classification of Size Designation in Clothing MC Based on Improved LBG Algorithm	Proceedings of the Second International Conference on Advanced Textile Materials and Manufacturing Technology	ISTP 检索		2010.10
6	The Change of Amount and Twists Effect to Electrical Performance of Carbon-coated Filaments	2nd International Conference on Manufacturing Science and Engineering, ICMSE 2011	EI 检索		2011.04
7	Study on the sensing property of Carbon-coated Filaments	2011 International Conference on Advanced Engineering Materials and Technology	EI 检索		2011.07

8	Classification and identification of young females' shoulder shape using the fisher discriminant analysis based on 3D body measurement	2nd International Conference on Frontiers of Manufacturing and Design Science	EI 检索		2011.12
9	基于神经网络集成的女下装号型归档模型构建	纺织学报		2013 年第 8 期	2013.08
10	基于体表角度的女子体型分类与识别	浙江理工大学学报		第 30 卷第 2 期	2013.03
11	Analysis of Young Women' s Lower Limb Shape Based on 3D Body Measurement	Applied Mechanics and Materials	EI 收录		2013.06
12	基于三维人体测量的青年女性臀部体型细分	纺织学报		2013 年第 9 期	2013.09

5.获奖情况

序号	项目名称	奖项名称及等级	授予单位	级别	获奖时间
1	多元联动复合型服装专业人才培养模式探索与实践	中国纺织工业协会教学成果一等奖（排名第一）	中国纺织工业协会	省部级	2013
2	坚持三个结合，培养具有创新能力的设计人才	浙江省教学成果一等奖（排名第一）	浙江省教育厅	省部级	2000
3	基于三维测量的杭州女装人体数据库的建立及应用	中国纺织工业协会科学技术奖三等奖	中国纺织工业协会	省部级	2008
4		浙江省教育系统“三育人”先进个人	浙江省教育厅	省部级	2012

5		浙江省第六届高等学校教学名师奖	浙江省教育厅	省部级	2010
6	服装 MC 关键技术研究及应用	杭州市科技创新十佳产学研合作科技成果转化项目	杭州市人民政府办公厅	省部级	2009
7		浙江理工大学第三届教学名师奖	浙江理工大学	校级	2008

6.获专利情况

序号	专利名称	专利类别	授权专利号	授权年份
1	一种使服装呈现三维立体图案的方法	发明专利	发明专利 201110417660.6	2011.12
2	一种人体下肢自动测量装置	实用新型专利	实用新型专利 ZL201220334854.X	2012
3	三维女子体型识别系统软件 V1.0	国家版权局软件著作权登记	软著登字第 077995 号, 登记号: 2007SR12000	2007.8
4	服装 MC 号型自动归档系统软件 V1.0	国家版权局软件著作权登记	软著登字第 092376 号, 登记号: 2008SR05197	2008.3
5	三维个性化服装 CAD 系统 V1.0	国家版权局软件著作权登记	软著登字第 115068 号, 登记号: 2008SR27889	2008.11
6	基于服装三维虚拟造型的面料分类系统软件 V1.0	国家版权局软件著作权登记	软著登字第 0341721 号, 登记号: 2011SR078047	2011.10
7	参数化青年女性人体特征显示系统 V1.0	国家版权局软件著作权登记	软著登字第 0544146 号, 登记号: 2013SR038384	2012

1. 主持的教改项目

信息名称： 教育部 财政部关于批准 2009 年度国家级实验教学示范中心建设单位的通知

信息索引： 360A08-07-2009-0392-1 生成日期： 2009-12-08 发文机构： 教育部 财政部

发文字号： 教高函[2009]28 号 信息类别： 高等教育

内容概述： 经过网上初评、终审评议和网上公示等程序，经研究，教育部、财政部批准北京工业大学土木工程实验教学中心等 142 个实验教学中心为 2009 年度国家级实验教学示范中心建设单位。

教育部 财政部关于批准 2009 年度国家级实验教学示范中心建设单位的通知

教高函[2009]28 号

各省、自治区、直辖市教育厅（教委）、财政厅（局），新疆生产建设兵团教育局、财务局，有关部门（单位）教育司（局）、财务司（局），教育部直属各高等学校：

根据《教育部 财政部关于实施高等学校本科教学质量与教学改革工程的意见》（教高〔2007〕1 号）的精神，按照 2009 年度高等学校本科教学质量与教学改革工程项目中国家级实验教学示范中心申报评审的要求，有关专家对各省教育行政主管部门报送的土建类、环境类、轻工纺织食品类、能源动力类、资源勘探类、交通运输类、航空航天类、水产类、农林工程类、临床技能类、中医类、公共卫生类、法学类、传媒类、艺术类、考古类、文科综合类、其他类等 18 个学科类别的实验教学中心进行了评审。经过网上初评、终审评议和网上公示等程序，经研究，现批准北京工业大学土木工程实验教学中心等 142 个实验教学中心为 2009 年度国家级实验教学示范中心建设单位（名单见附件）。

国家级实验教学示范中心建设单位要进一步加强建设，加大经费投入，完善运行管理机制，深化实验教学改革，创新实验教学模式，凝练优质实验教学资源，拓展培训、交流和合作方式，增强示范辐射能力，为全国高等学校实验教学的改革与发展发挥示范作用。建设过程中应执行《高等学校本科教学质量与教学改革工程项目管理暂行办法》（教高〔2007〕14 号）。

各省级教育行政主管部门和有关主管部门要不断推进国家级、省级两级实验教学示范体系建设，加大投入力度，完善配套政策，积极组织和支助本地区、本部门高等学校与国家级、省级实验教学示范中心的交流与合作，充分发挥实验教学示范体系的示范辐射作用。

附件：2009 年度国家级实验教学示范中心建设单位名单

中华人民共和国教育部

中华人民共和国财政部

二〇〇九年十一月二十八日

附件：**2009年度国家级实验教学示范中心建设单位名单**

轻工纺织食品类

东北农业大学食品科学与工程实验教学中心

东华大学现代纺织教育实验教学中心

华南理工大学轻工与食品实验教学中心

江南大学食品发酵实验教学中心

苏州大学纺织与服装设计实验教学中心

天津工业大学纺织实验教学中心

天津科技大学食品科学实验中心

西南大学食品科学与工程实验教学中心

浙江理工大学服装实验教学中心

中国农业大学食品科学与工程实验教学中心

能源动力类

长沙理工大学能源系统与动力工程实验教学中心

合肥工业大学新能源利用与电气控制实验教学中心

华北电力大学热能与动力工程实验教学中心

上海理工大学能源动力工程实验教学中心

天津商业大学热能与动力工程实验教学中心

浙江大学能源与动力实验教学中心

资源勘探类

大庆石油学院石油工程与地质实验教学中心

吉林大学应用地球物理实验教学中心

信息名称： 教育部 财政部关于批准第四批高等学校特色专业建设点的通知
信息索引： 360A08-07-2009-0307-1 生成日期： 2009-09-04 发文机构： 中华人民共和国教育部 中华人民共和国财政部
发文字号： 教高函[2009]16号 信息类别： 高等教育
内容概述： 教育部、财政部批准北京大学“理论与应用力学”等 671 个专业点为第四批高等学校特色专业建设点（其中经费自筹建设点 71 个，名单见附件）。

**教育部 财政部关于批准第四批高等学校
特色专业建设点的通知**

教高函[2009]16号

各省、自治区、直辖市教育厅（教委）、财政厅（局），新疆生产建设兵团教育局、财务局，有关部门（单位）教育司（局）、财务司（局），教育部直属各高等学校：

根据《教育部财政部关于实施高等学校本科教学质量与教学改革工程的意见》（教高〔2007〕1号）和 2009 年度高等学校特色专业建设点的规划，在有关学校和单位推荐基础上，经研究，现批准北京大学“理论与应用力学”等 671 个专业点为第四批高等学校特色专业建设点（其中经费自筹建设点 71 个，名单见附件），并将有关事宜通知如下：

一、建设高等学校特色专业是优化专业结构，提高人才培养质量，办出专业特色的重要措施。项目承担学校和项目负责人要充分认识建设特色专业的重要意义，按照两部有关加强“质量工程”本科特色专业建设的要求，紧密结合国家、地方经济社会发展需要，改革人才培养方案、强化实践教学、优化课程体系、加强教师队伍和教材建设，切实为同类型高校相关专业和本校的专业建设与改革起到示范带动作用。各地教育行政部门和中央有关部门（单位）要负责指导、检查、监督所属高等学校特色专业建设点项目的建设。在建设过程中，有关问题和建议请及时反馈至质量工程领导小组办公室。

二、高等学校特色专业建设点项目管理按照《教育部财政部关于实施高等学校本科教学质量与教学改革工程的意见》（教高〔2007〕1号）和《高等学校本科教学质量与教学改革工程项目管理暂行办法》（教高〔2007〕14号）执行。质量工程领导小组办公室将根据《高等学校特色专业建设点任务书》进行检查和验收。

项目资助经费按照每个建设点 20 万元的标准拨付，超出资助经费的部分由学校配套解决。项目经费管理按照《高等学校本科教学质量与教学改革工程专项资金管理暂行办法》（财教〔2007〕376号）执行。有关单位和学校要落实经费自筹建设点的经费。

三、高等学校特色专业建设点项目的承担学校应在学校网站设立专栏，对外公布项目的建设内容、实施方案和进展程度等相关信息，加强有关建设成果的宣传推广，充分发挥项目的示范作用。

附件： 第四批高等学校特色专业建设点名单

中华人民共和国教育部
中华人民共和国财政部
二〇〇九年九月四日

附件:

第四批高等学校特色专业建设点名单

项目编号	学校名称	专业名称	备注
TS1Z240	浙江工业大学	应用化学	经费自筹
TS11463	杭州电子科技大学	软件工程	
TS1Z241	杭州电子科技大学	电子科学与技术	经费自筹
TS11464	浙江理工大学	电子信息工程	
TS11465	浙江理工大学	服装设计工程	
TS11466	浙江中医药大学	中药学	
TS11467	浙江师范大学	汉语言文学	
TS1Z242	杭州师范大学	计算机科学与技术	经费自筹
TS11468	浙江工商大学	会计学	
TS11469	中国计量学院	自动化	
TS11470	浙江科技学院	化学工程与工艺	
TS1Z243	浙江科技学院	艺术设计	经费自筹
TS11471	浙江海洋学院	海洋渔业科学与技术	
TS11472	浙江林学院	园林	
TS11473	温州医学院	医学检验	
TS11474	湖州师范学院	小学教育	
TS11475	浙江传媒学院	广播电视编导	
TS11476	浙江财经学院	经济学	
TS1Z244	浙江财经学院	金融学	经费自筹
TS11477	中国美术学院	美术学	
TS11478	合肥工业大学	机械设计制造及其自动化	
TS11479	合肥工业大学	制药工程	
TS11480	合肥工业大学	食品科学与工程	
TS11481	中国科学技术大学	计算机科学与技术	
TS11482	安徽大学	电子信息工程	
TS11483	安徽大学	计算机科学与技术	
TS11484	安徽理工大学	地质工程	
TS11485	安徽工业大学	化学工程与工艺	
TS11486	安徽农业大学	植物保护	
TS11487	安徽医科大学	临床医学	
TS11488	安徽师范大学	英语	
TS11489	安徽师范大学	音乐学	
TS11490	安徽财经大学	经济学	
TS11491	安徽工程科技学院	艺术设计	
TS11492	安徽建筑工业学院	无机非金属材料工程	
TS11493	安徽中医学院	药学	
TS11494	淮北煤炭师范学院	计算机科学与技术	
TS11495	安庆师范学院	环境科学	

信息名称： 教育部 财政部关于批准 2007 年度国家精品课程建设项目的通知
信息索引： 360A08-07-2007-0653-1 生成日期： 2007-11-27 发文机构： 教育部 财政部
发文字号： 教高函[2007]20 号 信息类别： 高等教育
内容概述： 国家精品课程建设

教育部 财政部关于批准 2007 年度国家精品课程建设项目的通知

教高函[2007]20 号

各省、自治区、直辖市教育厅(教委)，新疆生产建设兵团教育局，有关部门(单位)教育司(局)，解放军总参谋部，部属各高等学校：

为贯彻落实《教育部 财政部关于实施高等学校本科教学质量与教学改革工程的意见》(教高〔2007〕1号)、《教育部关于进一步深化本科教学改革全面提高教学质量的若干意见》(教高〔2007〕2号)和《教育部关于全面提高高等职业教育教学质量的若干意见》(教高〔2006〕16号)精神，根据《教育部办公厅关于 2007 年度国家精品课程申报工作的通知》(教高厅函〔2007〕25号)，经过网络评审、专家会评以及上网公示，决定批准 2007 年度国家精品课程 660 门，其中普通高等学校本科课程 411 门，高职高专课程 172 门、网络教育课程 49 门，军队(含武警)院校课程 28 门。现予公布(名单见附件)。

一、国家精品课程荣誉称号有效期 5 年。期间，课程内容要按照规定上网，并取消所有登录用户名和密码，向全国免费开放。用户可登录高等学校本科教学质量和教学改革工程 <http://www.zlhc.org>，点击“国家精品课程建设”，或直接点击 <http://www.jpkcnet.com> 进入浏览国家精品课程内容和了解全国精品课程建设工作的相关信息。根据解放军总参谋部规定(〔2005〕参训兵字第 1178 号)，军队院校的国家精品课程要免费为全军院校使用，秘密(含)以下等级的课程必须在军事训练信息网上开放。可以公开的要向全国高校免费开放。军队院校的国家精品课程由总参谋部负责管理。

二、有关高等学校要按照《教育部办公厅关于印发<国家精品课程建设工作实施办法>的通知》(教高厅〔2003〕3号)和《教育部办公厅关于<国家精品课程建设工作实施办法>补充规定的通知》(教高厅〔2004〕13号)要求，进一步加强课程建设，不断改善网络条件，更新和完善课程网上教学资源；统计课程网站的点击率，及时了解掌握课程教学内容的辐射效果，收集分析用户的反馈意见；在有效期内，接受教育部组织的年度检查。

三、各级教育行政部门和高等学校要切实落实质量工程，进一步巩固教学工作的中心地位，继续加大经费投入并给予政策支持，推进优质资源的建设与共享。高等学校要充分利用国家精品课程的优质资源和建设经验，推进本校课程改革，不断提高教学质量。有关高等学校要保证国家精品课程免费开放，并不断改善网络条件和推进网上资源内容完善更新。未经著作权人许可，任何人不得将国家精品课程内容用作商业目的活动。

附件： 2007 年度国家精品课程名单

教育部 财政部
二〇〇七年十一月二十七日

附件：

2007 年度国家精品课程(本科)名单

(以学科为序)

序号	一级学科	二级学科	课程名称	课程学校	负责人
120	工学	轻工纺织食品类	制革装饰材料化学	陕西科技大学	马建中
121	工学	轻工纺织食品类	食品工程原理	上海交通大学	李云飞
122	工学	轻工纺织食品类	包装材料学	天津科技大学	王建清
123	工学	轻工纺织食品类	葡萄酒工艺学	西北农林科技大学	李华
124	工学	轻工纺织食品类	成衣工艺学	浙江理工大学	邹奉元
125	工学	轻工纺织食品类	食品保藏原理与技术	中国海洋大学	曾名湧
126	工学	生物工程类	生物工艺学	北京化工大学	谭天伟
127	工学	生物工程类	微生物学	浙江工业大学	沈寅初
128	工学	水利类	水文统计	河海大学	黄振平
129	工学	水利类	海岸动力学	河海大学	严以新
130	工学	水利类	水工建筑学	清华大学	金峰
131	工学	土建类	结构设计原理	长沙理工大学	张建仁
132	工学	土建类	建筑设计基础	华南理工大学	何镜堂
133	工学	土建类	水力学	济南大学	于衍真
134	工学	土建类	钢结构设计	青岛理工大学	王燕
135	工学	土建类	房屋建筑学	山东建筑大学	崔艳秋
136	工学	土建类	中国古建筑测绘	天津大学	王其亨
137	工学	土建类	建筑评论	同济大学	郑时龄
138	工学	土建类	钢结构	西安建筑科技大学	郝际平
139	工学	土建类	地下铁道	西南交通大学	高波
140	工学	土建类	建筑构造	重庆大学	魏宏杨
141	工学	武器类	弹药学	南京理工大学	李向东
142	工学	仪器仪表类	应用光学	长春理工大学	王文生
143	工学	仪器仪表类	自动测试系统	电子科技大学	童玲
144	工学	仪器仪表类	测试与检测技术基础	清华大学	王伯雄
145	工学	仪器仪表类	精密机械设计基础	天津大学	裘祖荣
146	工学	仪器仪表类	传感器技术	中国计量学院	李东升
147	管理学	工商管理类	中级财务会计	北京工商大学	杨有红
148	管理学	工商管理类	物流系统论	北京工商大学	何明珂
149	管理学	工商管理类	组织行为学	电子科技大学	井润田
150	管理学	工商管理类	管理会计	东北财经大学	吴大军
151	管理学	工商管理类	管理学	东北财经大学	卢昌崇
152	管理学	工商管理类	中小企业管理	对外经济贸易大学	林汉川
153	管理学	工商管理类	企业物流管理	湖南商学院	黄福华
154	管理学	工商管理类	电子商务管理	华中师范大学	王学东
155	管理学	工商管理类	基础会计学	暨南大学	宋献中

信息索引： 360A08-07-2006-0409-1 生成日期： 2006-08-08 发文机构： 教育部

发文字号： 教高[2006]9号 信息类别： 高等教育

内容概述： 普通高等教育“十一五”国家级教材规划

教 育 部 文 件

教高[2006]9号

教育部关于印发普通高等教育“十一五”国家级教材规划选题的通知

各普通高等学校、有关出版社：

为全面贯彻落实科学发展观，切实提高高等教育的质量，我部决定制订普通高等教育“十一五”国家级教材规划。经出版社申报、专家评审、网上公示，最后确定了9716种选题列入“十一五”国家级教材规划。现将普通高等教育“十一五”国家级教材规划选题印发给你们，请认真抓好“十一五”国家级规划教材的编写、出版、选用工作。现就做好“十一五”国家级教材规划提出如下意见：

一、“十一五”国家级规划教材的内容要坚持马克思主义、毛泽东思想、邓小平理论和“三个代表”重要思想，坚持社会主义方向，坚持党的教育方针，做到思想性和学术性的统一。

二、“十一五”国家级规划教材要适应教学改革和课程建设的发展，体现科学性、系统性和新颖性。要及时反映教学改革和课程建设的新成果，并随着学科的发展及时修订。

三、“十一五”国家级规划教材的编写、出版，要严格遵守国家有关出版法律、法规，恪守学术道德，坚守学术诚信，杜绝任何侵犯知识产权的行为发生。

四、承担任务的各方面要共同努力，通力协作，保证高质量出版“十一五”国家级规划教材。教材编著者所在高等学校要从政策、资金等方面提供条件，支持编著者按计划完成书稿编写工作；教材编著者，按时编写出高质量的教材；教材的出版单位要从资金等方面对教师编写教材予以保证，并严把出版环节，保证教材的编校和印刷质量，按时完成出版任务。

五、“十一五”国家级教材规划将采用项目模式进行管理，加强对编写、出版过程的监控。我部将通过全国普通高等教育教材网及相关媒体跟踪教材的编写、出版进程，发布相关评价信息。

六、“十一五”国家级教材规划将引入评审、评介和选用机制。充分发挥教学指导委员会等专家组织的作用，开展多种形式的教材评审与评介工作，促进教材质量的不断提高。各高等学校应加强教材选用管理，严把教材选用关，确保高质量教材进课堂。

普通高等教育“十一五”国家级规划教材统一标志已经确定，请从全国普通高等教育教材网（www.tbook.com.cn）上直接下载正式样张。

附件：普通高等教育“十一五”国家级教材规划选题表

教育部
二〇〇六年八月八日

附件： 普通高等教育“十一五”国家级教材规划选题表

教材名称	作者	作者单位	出版社
印刷机设计与计算	张海燕	西安理工大学	印刷工业出版社
包装工艺学	潘松年	西安理工大学	印刷工业出版社
包装与环境	戴宏民	重庆工商大学	印刷工业出版社
包装容器结构设计与制造	宋宝丰	株洲工学院	印刷工业出版社
包装装潢与造型基础	肖禾	株洲工学院	印刷工业出版社
成衣工艺学	邹奉元	浙江理工大学	浙江大学出版社
世界服装史	郑巨欣	中国美术学院	浙江科学技术出版社
服装工业制版	潘波	北京服装学院	中国纺织出版社
服装纸样设计原理与应用	刘瑞璞	北京服装学院	中国纺织出版社
服装品牌广告设计	王蕴强、贾荣林	北京服装学院	中国纺织出版社
时装画技法	邹游	北京服装学院	中国纺织出版社
服装表演基础	王以中	北京服装学院	中国纺织出版社
染整工艺实验教程	陈英	北京服装学院	中国纺织出版社
服装立体裁剪	张文斌	东华大学	中国纺织出版社
成衣工艺学	张文斌	东华大学	中国纺织出版社
纺织服装商品学	王府梅	东华大学	中国纺织出版社
纺纱学	郁崇文	东华大学	中国纺织出版社
机织学	朱苏康	东华大学	中国纺织出版社
针织学	龙海如	东华大学	中国纺织出版社
产业用纤维及其制品学	晏雄	东华大学	中国纺织出版社
表面活性剂化学及纺织助剂	陆大年	东华大学	中国纺织出版社
染料化学	何瑾馨	东华大学	中国纺织出版社
染整工艺设备(第2版)	吴立	东华大学	中国纺织出版社
现代染整实验教程	屠天民	东华大学	中国纺织出版社
染整工艺与原理	阎克路	东华大学	中国纺织出版社
纤维化学与物理	蔡再生	东华大学	中国纺织出版社
印染厂设计	崔淑玲	河北科技大学	中国纺织出版社
服装面料艺术再造	梁惠娥	江南大学	中国纺织出版社
纺织品染整工艺学(第2版)	范雪荣	江南大学	中国纺织出版社
服装卫生学	陈东生	闽江学院	中国纺织出版社
服装美学教程	徐宏力	青岛大学	中国纺织出版社
针织服装设计	谭磊	青岛大学	中国纺织出版社
服装CAD应用教程	陈建伟	青岛大学	中国纺织出版社
纺织材料学(双语版)	刘妍	青岛大学	中国纺织出版社
轻化工水污染控制	石宝龙	青岛大学	中国纺织出版社
功能纤维及功能纺织品	朱平	青岛大学	中国纺织出版社
纹织物设计	田琳	解放军信息工程大学	中国纺织出版社

浙江省教育厅关于公布省普通高校重点专业名单的通知

2008-03-14

来源：省教育厅高教处

浙教高教〔2008〕63号

各普通高校：

根据我厅《关于开展高校教学专项抽检和验收工作的通知》（浙教办高教[2007]186号），2007年下半年，我厅组织专家对2003年评定的省重点建设专业进行了评估验收。根据专家组综合评价，并经我厅研究，决定授予浙江工业大学国际经济与贸易等100个本专科专业为省普通高校重点专业，现将名单予以公布。

希望各重点专业所在学校继续增加投入，深化教学改革，积极发挥重点专业示范作用，提高人才培养质量。

浙江省教育厅

二〇〇八年三月十二日

附件：

- 1、浙江省本科高校重点专业名单
- 2、浙江省2007年普通高校重点专业检查结果(以小组为评价单位)

附件 1:

浙江省本科高校重点专业名单

序号	学校	专业	备注
13	浙江师范大学	物理学	
14	浙江师范大学	生物科学	
15	浙江师范大学	英语	
16	浙江师范大学	体育教育	
17	宁波大学	航海技术	
18	宁波大学	水产养殖学	
19	宁波大学	应用化学	
20	宁波大学	电气工程与自动化	
21	宁波大学	国际经济与贸易	
22	宁波大学	机械设计制造及自动化	
23	宁波大学	法学	
24	宁波大学	计算机科学与技术	
25	宁波大学	数学与应用数学	
26	中国美术学院	绘画	
27	中国美术学院	艺术设计	
28	中国美术学院	雕塑	
29	杭州电子科技大学	电子信息工程	
30	杭州电子科技大学	计算机科学与技术	
31	杭州电子科技大学	会计学	
32	杭州电子科技大学	机械设计制造及自动化	
33	杭州电子科技大学	通信工程	
34	杭州电子科技大学	软件工程	
35	浙江理工大学	纺织工程	
36	浙江理工大学	艺术设计	
37	浙江理工大学	机械设计制造及自动化	
38	浙江理工大学	服装设计与工程	
39	浙江理工大学	轻化工程	
40	浙江理工大学	电子信息工程	
41	浙江工商大学	工商管理	
42	浙江工商大学	信息管理与信息系统	
43	浙江工商大学	统计学	
44	浙江工商大学	国际经济与贸易	
45	浙江工商大学	食品科学与工程	

浙江省教育厅关于公布本科院校“十二五”优势专业建设项目立项名单的通知

来源:浙江省教育厅 日期: 2012-05-30

浙教高教〔2012〕70号

各本科院校:

根据《浙江省教育事业“十二五”规划》(浙发改规划〔2011〕1358号)和《浙江省高等教育“十二五”发展规划(2011—2015年)》(浙教高科〔2011〕153号)、《浙江省教育厅关于“十二五”期间全面提高本科高校教育教学质量的实施意见》(浙教高教〔2011〕170号)等文件精神,我厅组织了本科院校“十二五”优势专业建设项目的推荐评审工作。经学校申报、专家评议、我厅审核,确定中国美术学院的绘画等150个专业为本科院校“十二五”优势专业建设项目,现予公布(详见附件)。

实施“十二五”优势专业建设项目,旨在推进教育教学改革,提高人才培养质量。希望各高校牢固确立人才培养的中心地位,结合自身的办学定位和学科特色,注重内涵发展,加强教学团队建设,切实推进培养模式、课程教材、教学方式方法、教学管理等专业发展重要环节的综合改革,优化人才培养方案,促进人才培养水平的整体提升,形成一批教育观念先进、改革成效显著、特色更加鲜明的专业点,引领示范本校其他专业或同类高校相关专业的改革与建设。希望各优势专业建设项目负责人切实担负起建设责任,积极探索,加强管理,努力提高建设成效。

附件:本科院校“十二五”优势专业建设项目立项名单

浙江省教育厅
二〇一二年五月十八日

附件

本科院校“十二五”优势专业建设项目立项名单

序号	学校名称	专业代码	专业名称	专业负责人
36	宁波大学	040105W	小学教育	孙玉丽
37	宁波大学	081205	航海技术	郑彭军
38	宁波大学	070302	应用化学	干宁
39	宁波大学	080605	计算机科学与技术	王让定
40	宁波大学	071201	电子信息科学与技术	夏银水
41	宁波大学	080301	机械设计制造及其自动化	方志梅
42	宁波大学	080703	土木工程	郑荣跃
43	宁波大学	090701	水产养殖学	蒋霞敏
44	宁波大学	100301	临床医学	尹维刚
45	浙江理工大学	020102	国际经济与贸易	胡丹婷
46	浙江理工大学	050408	艺术设计	李加林
47	浙江理工大学	081402	轻化工程	余志成
48	浙江理工大学	080603	电子信息工程	包晓敏
49	浙江理工大学	080605	计算机科学与技术	贾宇波
50	浙江理工大学	081405	纺织工程	陈建勇
51	浙江理工大学	081406	服装设计与工程	邹奉元
52	浙江理工大学	080301	机械设计制造及其自动化	陈文华
53	浙江理工大学	080205Y	材料科学与工程	姚菊明
54	杭州电子科技大学	110203	会计学	王泽霞
55	杭州电子科技大学	070102	信息与计算科学	陈光亭
56	杭州电子科技大学	080603	电子信息工程	孙玲玲
57	杭州电子科技大学	080605	计算机科学与技术	戴国骏
58	杭州电子科技大学	080602	自动化	薛安克
59	杭州电子科技大学	080611W	软件工程	万健
60	杭州电子科技大学	080604	通信工程	李光球
61	杭州电子科技大学	071205W	信息安全	游林
62	杭州电子科技大学	080606	电子科学与技术	秦会斌
63	杭州电子科技大学	080608Y	电气工程与自动化	刘士荣
64	杭州电子科技大学	080301	机械设计制造及其自动化	陈国金
65	浙江工商大学	110203	会计学	许永斌
66	浙江工商大学	110201	工商管理	郝云宏
67	浙江工商大学	020102	国际经济与贸易	俞毅
68	浙江工商大学	020104	金融学	钱水土
69	浙江工商大学	110209W	电子商务	琚春华
70	浙江工商大学	030101	法学	谭世贵

浙江省教育厅关于公布 2010 年度省高校重点教材建设项目的通知

2011-02-14

来源:

浙教高教〔2011〕10 号

各有关高校:

为推进我省高校教材建设,提高人才培养质量和办学水平,根据《浙江省教育厅关于调整有关教学改革与建设项目评审办法的通知》(浙教高教〔2009〕56 号)和《浙江省教育厅办公室关于做好 2010 年度省高校重点教材建设立项工作的通知》(浙教办高教〔2010〕106 号)精神,我厅组织开展了省高校重点教材建设项目申报、评审工作。经各高校按限额推荐、省本科和高职各专业教学指导委员会评审、我厅审定,本科高校 19 套本科系列教材和高职高专 16 套系列教材列为 2010 年度浙江省高校系列教材建设项目,244 本本科教材和 355 本高职高专教材列为 2010 年度浙江省高校自选主题重点教材建设项目,现予以公布。

希望各高校和相关专业教指委加强对省重点教材建设项目的指导和管理,以确保质量,按时出版。本次立项资助的重点教材建设项目,出版时需在教材封面上标注浙江省“十一五”重点教材建设项目 LOGO(附件 5,可在省教育厅门户网站下载)。资助经费另文下达。

附件:

- 1.2010 年度浙江省高校自选主题重点教材建设项目名单(本科)
- 2.2010 年度浙江省高校自选主题重点教材建设项目名单(高职高专)
- 3.2010 年度浙江省高校系列教材建设项目名单(本科)
- 4.2010 年度浙江省高校系列教材建设项目名单(高职高专)
- 5.浙江省“十一五”重点教材建设项目 LOGO

二〇一一年二月十一日

改变字体:大 中 小

附件 3:

2010 年度浙江省高校系列教材建设项目名单(本科)

序号	教学指导委员会	秘书长	系列教材名称	教材名称	主编	主编所在学校
8	机械类	方志梅	机械工程实践教学系列教材	工程训练实训教程	周继烈	浙江大学
				机械工程项目实践教学	潘柏松	浙江工业大学
				机械基础实验教程	竺志超	浙江理工大学
				机械设计实践与竞赛指导	应富强	浙江工业大学
9	电气信息类	秦会斌	电气信息类专业新技术类课程群教材	物联网技术与应用	韦巍	浙江大学
				绿色照明技术	罗友	杭州电子科技大学
				表面贴装与混合电路技术	方达伟	湖州师范学院
				工业生产自动化新技术	薛安克	杭州电子科技大学
				短程无线通信技术	梁丰	宁波大学
10	交通运输类与海洋工程类	谢永和	海洋工程设计系列教材	海洋平台结构设计	张吉萍	浙江海洋学院
				海底管道	张兆德	浙江海洋学院
				海洋平台舾装设计	张晓君	浙江海洋学院
				海洋平台动力设备	郑道昌	宁波大学
				海洋平台轮机系统设计	李德堂	浙江海洋学院
11	轻工纺织食品类	季晓芬	服装专业基础系列教材	时装工业导论	郭建南	浙江理工大学
				成衣工艺学	邹奉元	浙江理工大学
				服装立体造型设计基础	季晓芬	浙江理工大学
				成衣设计及立体构成	魏静	温州大学
				时装市场与商品企划	任力	浙江理工大学
12	护理学及预防医学类	姜丽萍	护理类系列教材	基础护理技术实验指导 ——以任务为导向	吴永琴	温州医学院
				护理综合模拟实验教程	姜丽萍	温州医学院
				临床护理实践指导	尹志勤	温州医学院
				护士核心能力培养案例教程	孙秋华	浙江中医药大学
				妇儿护理实验指导	叶志航	浙江大学邵逸夫医院

3、主持的科研项目

基于个性化人体特征的三维服装虚拟试衣关键问题研究

浙江省自然科学基金资助项目批准通知

浙江理工大学邹奉元同志：

根据浙江省自然科学基金相关管理规定和专家评审意见，
浙江省自然科学基金委员会决定资助您申请的以下项目：

项目编号	Y1110504		资助领域 分类代码	E051002	
项目名称	基于个性化人体特征的三维服装虚拟试衣关键问题研究				
项目负责人	邹奉元	依托单位	浙江理工大学		
项目类别	一般项目	研究期限	2011年01月—2013年12月		
资助经费 (万元)	5.0	配套经费 (万元)	3.0		
序号	其他主要 成员	证件号码	性别	单位名称	项目分工
1	李重	3211021975090 63115	男	浙江理工大学	理论与方案研究
2	杨允出	1201021979112 90713	男	浙江理工大学	理论与方案研究
3	陈敏之	5102151978071 81023	女	浙江理工大学	算法设计与指导
4	丁笑君	3307261981122 2002X	女	浙江理工大学	算法设计与实现
5	张敏	3326031974092 80047	女	浙江理工大学	算法设计与实现
6	金娟凤	3303811987110 8654X	女	浙江理工大学	算法设计与实现

浙江省自然科学基金委员会

二〇一二年四月十一日



自动人腿参数测量系统研发

合同登记编号:

2010330004002054

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技术开发合同书

项目名称: 自动人腿参数测量系统研发

委托方: 绍兴振德医用敷料有限公司

(甲方)

研究开发方: 浙江理工大学

(乙方)

签定地点: 浙江省杭州市

签定日期: 2010年8月2日

有效期限: 2010年8月2日至2011年10月30日

依据《中华人民共和国合同法》的规定，合同双方就自动人腿围度测量系统研发项目的技术开发，经协商一致，签订本合同。

一、技术的内容、形式和要求：

技术的内容：

以甲方的要求开发出符合要求的自动人腿围度测量系统，该系统能方便快捷、易于操作地自动测量人腿的三个围度脚底上 12cm 处、胫骨节的下端、大腿根下（裆下）5cm 处，精度达到 $\pm 1\text{cm}$ 内，测量两个长度胫骨节的下端到地、大腿根（裆下）5cm 到地，精度达到 $\pm 0.5\text{cm}$ 。乙方在软件交付后免费为甲方提供一年的系统维护服务。

形式：

委托开发。

二、应达到的技术指标和参数：

- 1、依甲方的实际要求，设计开发出的自动人腿围度测量系统能测量出人腿的三个围度及两个长度，围度精度达到 $\pm 1\text{cm}$ 内，长度精度达到 $\pm 0.5\text{cm}$ 。能用于在实际中对真实的人腿进行方便快捷测量，并保存数据。
- 2、该系统由测量模块和数据处理模块组成，呈半封闭空间，其获得的数据传输到计算机，由计算机的数据处理软件进行处理，得到所需的人腿五个参数。
- 3、实际操作时，将被测人的详细信息输入，这些信息应至少包括被测人的姓名、年龄、性别、职业、联系方式等，只有被测人的相关信息完整输入后，才能进行下一步操作，被测人体进入此半封闭空间，静立几秒钟，即可结束测量，测得数据在计算机中显示并保存。
- 4、测量后保存的数据能以 EXCEL 格式导出并通过网络或移动硬盘传输。
- 5、所开发的测量系统制造成本原则上不高于 3 万元。

三、研究开发计划：

合同生效之日起至 2010 年 8 月中旬完成需求的全面分析和工作任务的具体划分，并形成文档。

2010 年 9 月中旬，完成基本平台建立。

2011 年 1 月中旬，完成各种关键算法的编写。

2011 年 4 月中旬，完成各模块的集成形成系统整体，形成系统的初步雏形验收。

2011 年 6 月底，完成系统小范围的测试、评估及改进。

2011 年 8 月底，完成系统的改进。

2011 年 10 月初可以进行交付验收。

四、研究开发经费、报酬及其支付或结算方式：

(一) 本项目研究开发经费总额为壹佰万元，其中柒拾伍万元用于甲方购置设备、材料、人员费等，贰拾伍万元用于支付给乙方的研究开发费用。

(二) 经费和报酬支付方式及时限：

支付给乙方的经费 25 万元，分三期支付：

第一期支付经费 8 万元，在合同生效日起的 1 周内到位。

第二期支付费用 10 万元，在具有基本功能雏形后 1 周内到位。

第三期支付经费 5 万元，在检测验收后 1 周内支付。

第四期支付经费 2 万元，在该项目验收、正常运行并维护服务满一年支付。

五、利用研究开发经费购置的设备、器材、资料的财产权属：

利用甲方支付给乙方的贰拾伍万元购置的设备、器材、资料归乙方。

甲方购置的设备、器材、资料归甲方。

六、履行期限、地点和方式：

本合同自 2010 年 8 月 2 日至 2011 年 10 月 30 日

在 杭州（地点）履行。

本合同的履行方式：乙方提交自动人腿围度测量系统及相关技术资料给甲方。

七、技术情报和资料的保密：

保密范围：有关开发系统的技术情报和资料、甲乙方的开发计划、开发进展、研究成果、生产信息及其他在开发过程中知悉甲乙方的商业秘密和技术秘密。

保密方式：未经甲乙一方书面授权的，任何一方不得向第三方泄露/公开保密信息；也不得在公开或内部刊物上发表保密信息；不得允许他人使用保密信息；不得以其中一方的保密信息为背景对外提供技术支持、技术服务、技术交流、技术发布。

保密期限：本合同开始洽谈之日起至保密信息成为公开信息前，但不早于开发成果交付之日起满五年。

八、技术协作和技术指导的内容:

甲方为乙方提供乙方为完成该系统软件所必需的相关资料,配合乙方进行相关开发工作。必需的相关资料如下:

- 1、需求说明书;
- 2、技术指标。

九、风险责任的承担:

在履行本合同的过程中,确因在现有水平和条件下难以克服的技术困难,导致研究开发部分或全部失败所造成的损失,乙方不承担任何责任,同时乙方放弃要求甲方支付后续费用的权利,甲方已支付乙方的所有前期费用不予退还。

十、技术成果的归属和分享:

1、合作双方确定,因履行本合同所产生的技术成果及其相关知识产权权利归双方所有,若申请专利应由双方共同申请,申请专利的费用及专利年费由甲方承担。

2、乙方可以利用该研究成果(仅限研究方法)作为本校教学使用,但不得将本项目中的技术资料在教学过程中披露。

3、本技术成果乙方同意由甲方免费独占使用,未经任一方书面同意,另外一方不得许可任何第三方使用。

4.若甲方要求将技术成果有偿转让给第三方使用的,乙方有义务配合,但是转让或许可所得费用由双方各半分享,除好士德外,甲方不得进行无偿转让。

十一、验收的标准和方式:

研究开发所完成的技术成果,达到了本合同第二条所列技术指标,按双方商定的验收方案,采用甲方确认的方式验收,由甲方出具技术项目验收证明。乙方提供系统,现场测试,按合同规定的技术指标进行验收。

十二、违约金或者损失赔偿额的计算方法:

技术开发违反本合同约定,违约方应当按以下方式承担违约责任。(除下述约定外,双方同意不再追究对方其他违约责任)

1.本协议签订之日起7日内支付第一期开发经费计人民币捌万元整。到2011年4月,甲方按研发协议第三条要求进行验收,如因乙方原因导致研发进度未能按期完成,甲方有权终止合同;如第一期开发成果通过验收,甲方支付给乙方第二期开发经费共计人民币拾万元整;到2011年10月底如研发项目未能按期完成,甲方有权终止合同。

2.乙方未经甲方同意向第三方泄漏本合同第七条所规定需要保密的

技术情报和资料，承担的违约金最多为甲方已支付乙方的研究开发经费；若乙方其他违约，承担的违约金最多不超过甲方已支付乙方的费用。

3. 甲方若未按合同约定时间支付开发经费的，乙方应向甲方催告，经催告后甲方仍在限期内不履行义务的，乙方可以决定中止合同。

十三、争议的解决办法：

因履行本合同而发生的争议，应协商、调解解决。协商、调解不成的，依法向被告方所在地人民法院起诉。

十四、本合同未尽事宜，双方另行协商。

十五、其他

由本项目衍生的政府部门立项项目应由甲乙双方共同申报，具体分配比例，双方另行协商。

委托方 (甲方)	委托方名称 (或姓名)	绍兴振德医用敷料有限公司(签章)		
	法定代表人	卓建刚(签章)	委托代理人	胡学强(签章)
	项目负责人	胡学强(签章)		
	通讯地址	浙江绍兴皋北经济开发区		
	联系电话	0575-88757272	E-mail	hxy@zhende.com
	开户银行			
	帐号		邮政编码	312035
研究开发方 (乙方)	研究方名称	浙江理工大学(签章)		
	法定代表人	(签章)	委托代理人	(签章)
	项目负责人	邹康元(签章)		
	通讯地址	杭州市下沙高教园区西区		
	联系电话		E-mail	zqwang@zj.com
	开户银行	工行杭州高新支行营业部		
	帐号	1202026209014400967	邮政编码	310018

4、科研论文

青年女子体型特征指标及岭回归预测研究



纺织学报

FANGZHI XUEBAO

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目次

■研究论文■

- 无彩数码提花织物的创新设计原理和方法
周超 吴文正(1)
- 电子雕刻系统用高频电—机械转换器的研制
方平 丁凡 李其朋等(6)
- 亚麻脱胶过程中常用酶类的动态变化
彭源德 杨喜爱 严理等(11)
- 聚丙烯酸酯类浆料的合成及性能
崔建伟 熊结刚 张慧萍等(15)

■研究探讨■

- 聚丙烯腈基中空碳纤维膜制备及结构研究
刘恩华 李树锋 程博闻等(19)
- 苧麻纤维机械物理性能的主成分及聚类分析
罗中钦 崔国贤 杨艳春等(22)
- 好氧菌脱胶大麻的研究
冯新星 陈建勇 钱微君等(25)
- 阻燃处理对聚乳酸纤维性能的影响
李亚滨 寇士军(28)
- 织物缩水机理及其数学模型的研究与应用
傅菊芬 白伦(31)
- 基于神经网络的织物疵点识别技术
陈俊杰 谢春萍(36)
- 环氧交联剂 EH 对苏木植物染料的固色作用
周家伟 程万里(39)
- 基于 ANSYS 的织针淬火加热过程的温度场模拟
陈海燕 朱世根 丁浩等(44)
- 服装纸样设计的差异匹配原理与应用
戴建国 叶泓 杨玉平(48)
- 服装纸样 CAD 中曲线修改的研究
王宏付 林慧(53)
- 青年女子体型的特征指标及岭回归预测研究
邹奉元 丁笑君 潘力丰(56)

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Application of Neural network to Identification of Young females' Body type

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back bust, waist, front hip and back hip. The samples under test of classification of size-designation in MC are collected by measuring the net body-measurements of 129 female youth aged 18-24 from Jiangsu and Zhejiang Provinces with TC2 3D body measuring apparatus from United States^[9].

3.2 Result of experiment and analysis

The output result of automatic classification of size designation in clothing MC based on improved LBG algorithm is a subset of MC size designation data-base, and the number of size designations of test samples is fixed as 11. Then all of the 129 test samples can be mapped to the 11 final size designations by using the nearest neighbor rule. The output part includes the names of 11 selected size designations, the data of control positions of each size designation, as well as all the sample serial numbers suitable for each size designation. The results of experiment are as follows:

size 1: name 170/92AF1B3; suit to the following samples: 62, 95, 96,101, 102, 121, 123, 125, 129
.....

size 11: name 160/84AF2B3; suit to the following samples: 4, 11, 12, 27, 35, 44, 56, 60, 114

Experts' subjective judgment method is adopted to evaluate the result of automatic classification of size designation in MC. The members of expert group are required to have both professional skills and wealthy experience as well. This experiment requires experts with more than 10 years working experiences in fashion industry or in technology research of fashion in universities. Totally, 15 experts are chosen. Their occupations are shown in Table 1.

Table 1 Proportion of experts of subjective judgement

Occupation	Number (unit: person)	Proportion (unit: %)
Quality control	2	13.3%
Production planning	4	26.7%
Technology management	5	33.3%
Associate-professor	3	20%
Professor	1	6.6%
Total	15	100%

Each one of the above-mentioned experts makes judgment separately on the output results of the 129 tested samples using the automatic classification of size designation in clothing MC based on improved LBG algorithm. He/She compares the data of the 16 control positions of every tested sample with the data of the 16 control positions of the size designation it belongs to. If he/she thinks the data of the 16 control positions of the tested sample coincide with the corresponding data of the control positions of the size designation which it belongs to, then the expert puts a $\sqrt{\quad}$ in the questionnaire. After making judgment on every control position, if the expert thinks the tested sample coincides with the size designation it belongs to, he/she puts a $\sqrt{\quad}$ in the overall evaluation. Each expert's questionnaire is totalized, thus we get the judgment result indicated in Table 2.

Table 2 Accuracy rate of the result of automatic classification of size designation based on improved LBG algorithm

expert	correct number (unit: person)	wrong number (unit: person)	accuracy rate
expert #1	121	8	93.8%
expert #2	119	10	92.2%
expert #3	123	6	95.3%
expert #4	121	8	93.8%
expert #5	118	11	91.5%
expert #6	119	10	92.2%
expert #7	120	9	93.0%
expert #8	124	5	96.1%
expert #9	121	8	93.8%
expert #10	121	8	93.8%
expert #11	122	7	94.6%
expert #12	119	10	92.2%
expert #13	122	7	94.6%
expert #14	122	7	94.6%
expert #15	120	9	93.0%

It can be seen from Table 2 that the highest accuracy rate is 96.1% with 124 correct numbers and 5 wrong numbers and the lowest accuracy rate is 91.5% with 118 correct numbers and 11 wrong numbers. It can be concluded that the accuracy rate of the result of this experiment using automatic classification of size designation in clothing MC is not below 91.5%. Generally speaking, with the increase of total number of the size designations to be classified, the accuracy rate will be increased gradually as well.

4 Conclusion

Using the improved LBG algorithm model to study and simulate the technology and experience of manual classification of size designation in MC can achieve the automatically computer-generated series of size designation in MC with the purpose of reducing the workload and improving the efficiency of classification of size-designation. Through the experiment on testing samples of classification of size designation in MC, it shows that the improved LBG algorithm has high efficiency and preferable precision.

The subsequent research can continue to extend the capacity of test samples and refine the size designation data-base. Besides, in the dimensionality weighting calculation, the weight distribution only take the influence of each control position on body-fitness degree of body-figure characteristics into consideration, which is only applicable to the operation of well-fitting clothing. So it needs to consider the factor of different types of clothing to improve the mathematical model of nearest neighbor rule and perfect the automatic classification system of garment size designation continuously.

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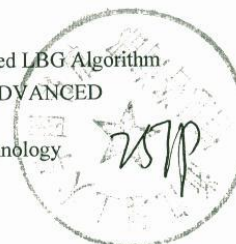
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目 录

1 Structure and Thermal Stability of Nanoclay/flax Nanocomposite	1
Chunhong Wang ^{1,2} , Frank K. Ko ¹ , Mercedes Alcock ³	
<i>(1. Department of Materials Engineering, the University of British Columbia, Vancouver, Canada</i>	
<i>2. Textile College, Tianjin Polytechnic University, Tianjin, China</i>	
<i>3. Composites Innovation Centre Manitoba, Inc. Manitoba, Canada)</i>	
2 Multifunctional Composite Nanofibers	5
Frank Ko, Masoumeh Bayat, Heejae Yang	
<i>(Advanced Fibrous Materials Laboratory, University of British Columbia, Canada)</i>	
3 Liquid Crystalline Electrospinning of Carbon Nanotube Reinforced Cellulose Fibers from Bamboo	11
Yuqin Wan, Frank K. Ko	
<i>(Advanced Fibrous Materials Laboratory, Department of Material Engineering, University of British Columbia)</i>	
4 Structures and Properties of Kapok Fiber	17
Qiuling Cao, Yi Cao, Lin Wang, Xiaowei Sun	
<i>(Department of Textiles, Henan Institute of Engineering, Zhengzhou, China)</i>	
5 Analysis on Structure of Wool Keratin Film by FT-IR and SEM	21
Liping Chen, Ping Cui	
<i>(College of Mechanical and Electric Engineering, Lanzhou University of Technology, Lanzhou, Gansu, China)</i>	
6 Preparation and Characterization of CA/CeO₂ Composite Nanofibers	24
Rui Chen, Xiaoqiang Zhang, Wenjun Dong, Chaorong Li	
<i>(Department of Physics, and Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)</i>	
Research on the Structure and Character of a Thermal Regulating Fiber	29
Weilai Chen ¹ , Ying Gao ¹ , Jianxiao Zhu ¹ , Zhebin Tang ¹ , Yihui Gong ²	
<i>(1. School of Materials and Textiles, Zhejiang Sci-Tech University, Hangzhou, China</i>	
<i>2. Zhejiang Sunjazz Garments Co., Ltd., Yiwu, China)</i>	
Preparation and Characterization of Nanofibrous Bioactive Glass Scaffolds	33
Chunxia Gao, Akira Teramoto, Koji Abe	
<i>(Faculty of Textile Science and Technology, Shinshu University, Nagano, Japan)</i>	

- 9 **Study on the Preparation and Characterization of SWNTs/Lyocell Composite Fibers**.....37
 Baohui Guan, Huihui Zhang, Gesheng Yang, Huili Shao, Xuechao Hu
(State Key Laboratory for Modification of Chemical Fibers and Polymer Materials, College of Material Science and Engineering, Donghua University, Shanghai, China)
- 10 **The Effect of Acids on Mechanical Properties of PPS Fibers**41
 Xiangbing He¹, Bin Yu¹, Jian Han^{1,2}, Xinbo Ding¹, Mitsuo Matsudaira³
 (1. School of Materials and Textiles, Zhejiang Sci-Tech University, Hangzhou, China
 2. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China
 3. Kanazawa Univ., Kakuma-machi, Kanazawa City, Japan)
- 11 **Removal of Indoor Ammonia with Fe (III)-modified PAN Fiber Complexes**44
 Xing Li¹, Yongchun Dong^{1,2}, Jiangxing He¹, Zhenbang Han^{1,2}, Zhichao Wang¹
 (1. Division of Textile Chemistry & Ecology, School of Textiles, Tianjin Polytechnic University, Tianjin, China
 2. State Key Laboratory Breeding Base of Photocatalysis, Fuzhou University, Fuzhou, China)
- 12 **Preparation of Catalytic Activated Carbon Fiber and Its Catalytic Oxidation Performance to 4-nitrophenol**49
 Yanli Li, Chunxia Ma, Qiaosheng Guo, Wenxing Chen
(Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)
- 13 **Influence of SiC Coating on the Oxidation Behavior of PAN Carbon Fiber at Elevated Temperatures**54
 Ye Li, Lina Wang, Weihui Xie, Jianjun Chen
(Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)
- 14 **Investigation of Osteoblast-like MC3T3-E1 Cells on a Collagen-like Protein and Poly (lactic-co-glycolic acid) Nanofibrous Composite Scaffold**59
 Yuan Li, A. Teramoto, K. Abe
(Department of Functional Polymer Science, Faculty of Textile Science and Technology, Shinshu University, Ueda, Nagano, Japan)
- 15 **Electrospun Polyvinyl Alcohol/Halloysite Nanotubes Composite Nanofibers**61
 Ruijuan Liao¹, Baochun Guo^{1,2}, Jianqing Zhao¹, Wen You Zhou³
 (1. Department of Polymer Materials and Engineering, South China University of Technology, Guangzhou, China
 2. State Key Laboratory of Pulp and Paper Engineering, South China University of Technology, Guangzhou, China
 3. Discipline of Orthodontics, Faculty of Dentistry, The University of Hong Kong, Hong Kong, China)

- 16 **Effect of Rheological Properties on Electrospinning of Ultra High Molecular Weight (UHMW) Poly(vinyl alcohol)**68
 Fan Liu¹, Yasushi Murakami², Qing-Qing Ni²
 (1. *Interdisciplinary Graduate School of Science and Technology, Shinshu University, Ueda, Japan*
 2. *Faculty of Textile Science and Technology, Shinshu University, Ueda, Japan*)
- 17 **Synthesis and Characterization of PSA-PEG Block Copolymer Based on Polysulfonamide and Amine-Terminated Polyethylene Glycol**72
 Li Liu^{1,2}, Weiwei Gu², Jie Zhou², Yanan Wu², Changfa Xiao¹
 (1. *Key Laboratory of Hollow Fiber Membrane Material and Membrane Process of Ministry of Education, Tianjin Polytechnic University, Tianjin, China*
 2. *Dept. of Polymer Science, School of Material Science and Engineering Technology, Shanghai Univ., Shanghai, China*)
- 18 **Shape Memory Effect and Actuation Property of Shape Memory Polymer Based Nanocomposites**76
 Qingqing Ni, Li Zhang
 (Department of Functional Machinery and Mechanics, Shinshu University, Ueda-shi, Japan)
- 19 **The Relationship between the Structures and Mechanical Properties of A. perilk**82
 Chengjie Fu, Zhengzhong Shao
 (Key Laboratory of Molecular Engineering of Polymers of Ministry of Education, Advanced Materials Laboratory, Department of Macromolecular Science, Fudan University, Shanghai, China)
- 20 **Flexible Tactile Sensor Based on PVDF Fibrous Membrane**84
 Yongrong Wang¹, Jianming Zheng², Peihua Zhang¹, Wenxing Chen³, Chunye Xu^{2,4}
 (1. *College of Textiles, Donghua University, Shanghai, China*
 2. *National Laboratory for Physical Sciences at Microscale, University of Science and Technology of China (USTC), Hefei, China*
 3. *Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China*
 4. *University of Washington, USA*)
- 21 **Modification of Wool Fiber Using Freeze Treatment**88
 Zhengwei Wang, Ruoying Zhu, Jianfei Zhang
 (School of Textiles, Tianjin Polytechnic University, Tianjin, China)
- 22 **Preparation and Properties Research of Poly(lactide-co-glycolide)/Silk Blend Nanofibrous Membrane**93
 Hongwei Xiao¹, Jie Xiong¹, Ni Li¹, Hongping Zhang¹, Junjun Xie²
 (1. *Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China*
 2. *Clinical Medical College, Hangzhou Normal University, Hangzhou, China*)

- 23 **Effect of Low Temperature Plasma Treatment on Surface Properties of Polysulfonamide Fiber**98
 Jianzhong Yang, Lei Ren
(School of Textile and Material, Xi'an Polytechnic Univ., Xi'an, China)
- 24 **Rheological Behavior and Spinning Performance of Cellulose/[BMIM]Cl Solutions Prepared by Two-Steps Dissolving Process**103
 Huihui Zhang, Tao Cai, Huili Shao, Xuechao Hu
(State Key Laboratory for Modification of Chemical Fibers and Polymer Materials, College of Material Science and Engineering, Donghua University, Shanghai, China)
- 25 **Fabrication and Application of Carbon Nanotube/Magnetite Composites**107
 Li Zhang¹, Qing-Qing Ni², Yoshio Hashimoto¹
*(1. Faculty of Engineering, Shinshu University, Japan
 2. Faculty of Textile Science & Technology, Shinshu University, Japan)*
- 26 **Preparation and Regeneration of Bioplasts for Biomodification of Polyester**111
 Weiling Zhang, Jianfei Zhang, Zheng Li, Jixian Gong, Qiuji Li, Cheng Chen, Zhaolong Hu
(Key Laboratory of Advanced Textile Composites, Tianjin Polytechnic University, Ministry of Education, Tianjin, China)
- 27 **Preparation and Properties Characterization of Butyl-methacrylate Copolymer Absorptive Functional Fiber**115
 Zhongjuan Zhang, Changfa Xiao, Naiku Xu
(Tianjin Key Laboratory of Fiber Modification and Function Fiber, Tianjin Polytechnic University, Tianjin, China)
- 28 **Solubility of Bacterial Cellulose in LiCl/DMAc Solvent System**119
 Chuanjie Zhang, Ping Zhu, Liu Wang
(Key Laboratory of Green Processing and Functional Textiles of New Textile Materials of Ministry of Education, Wuhan Textile University, Wuhan, China)
- 29 **Photocatalytic Properties of TiO₂ Supported on Pd-modified Carbon Fibers**124
 Yaofeng Zhu¹, Yaqin Fu², Qing-Qing Ni¹
*(1. Graduate School of Science and Technology, Shinshu University, Japan
 2. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou 310018, China)*
- 30 **Impregnation of Metal Complex into Epoxy Insulation Materials Using Supercritical Carbon Dioxide and Its Application for Copper Plating**128
 H. Ohnuki¹, S. Sumi², T. Hori¹
*(1. Fiber Amenity Engineering Course, Graduate School of Engineering, University of Fukui, Fukui, Japan
 2. Guangzhou Meadville Electronics Co., Ltd., Guangzhou, China)*

31	Synthesis, Characterization and Application of Polyurethane Modifying Polyether Block Polysiloxane	135
	Qiufeng An, Fan Yang, Kefeng Wang, Ge Li <i>(Key Laboratory of Auxiliary Chemistry and Technology for Chemical Industry, Ministry of Education, Shaanxi University of Science and Technology, Xi'an, China)</i>	
32	Preparation of Bacterial Cellulose Nanofiber with Silver Nanoparticles by In Situ Method	140
	Zhijiang Cai ^{1,2} , Guang Yang ¹ <i>(1. School of Textiles, Tianjin Polytechnic University, Tianjin, China 2. Key Laboratory of Advanced Textile Composites, Ministry of Education of China, Tianjin, China)</i>	
33	Study and Development of New Motorcyclists' Racing Suit Protector	144
	Nannan Cao, Jianwei Ma, Shaojuan Chen <i>(Qingdao University, Qingdao, China)</i>	
34	Study on the Morphology and Damping Properties of the Organic Hybrids of Chlorinated Polyethylene and Hindered Phenol	149
	Xinbo Ding ¹ , Tao Liu ¹ , Jian Han ² <i>(1. College of Material & Textile Engin., Zhejiang Sci-Tech University, Hangzhou, China 2. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)</i>	
35	Study on Energy Absorption of Epoxy Resin Composite Targets Enforced with SiC Powder and Twaron Staple Subjected to Bullet Impact	153
	Liping Guan ^{1,2} , Jianchun Zhang ^{1,3} <i>(1. College of Textile, Donghua University, Shanghai, China 2. Ningbo Advanced Textile Technology & Fashion CAD Key Laboratory, Zhejiang Textile & Fashion College, Ningbo, China 3. The General Logistics Department of PLA, Beijing, China)</i>	
36	Research on Acoustic Performance of Basalt Filament Diaphragm Fabric	157
	Zongfu Guo, Zhili Zhong, Ruibin Yang <i>(School of Textile, Tianjin Polytechnic University, Tianjin, China)</i>	
37	Preparation and Characterization of Polypropylene Master-batches Containing Electret for Meltblown Nonwoven	162
	Jian Han, Xiangbing He, Bin Yu, Guoping Xu, Xingbo Ding <i>(Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)</i>	
38	Validation of Fragile Silk Fabrics with Fibroin Protein and Ethylene Glycol Diglycidyl Ether	166

Xiaofang Huang¹, Zhiwen Hu¹, Zhiqin Peng¹, Jing Zhang¹, Xiaoye Cao¹, Yang Zhou², Feng Zhao²
 (1. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China
 2. China National Silk Museum, Hangzhou, China)

- 39 **Study on Forming Technology and Mechanical Properties of Biodegradable Hemp Fiber/ Polylactic Acid Composites**170
 Lihua Lv, Yongling Yu
 (Green Applied Fiber Technology Institute, Dalian Polytechnic University, Dalian, China)
- 40 **Rheological Behavior of Spinning Dope of Polyvinyl Alcohol/attapulgitite Nanocomposites**.....174
 Zhiqin Peng¹, Jinchao Yu¹, Hong Xu², Zhiping Mao²
 (1. College of Materials and Textile, Zhejiang Sci-Tech University, Hangzhou, China
 2. College of Materials Science and Engineering, State Key Laboratory for Modification of Chemical Fibers and Polymer Materials, Donghua University, Shanghai, China)
- 41 **Finite Element Calculation on the Quasi-static Impact Performance of 3D Integrated Hollow Woven Structure Composites**180
 Wei Tian, Chengyan Zhu
 (College of Materials and Textiles, Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)
- 42 **Effect of Different Fabric Skin Combinations on Predicted Sweating Skin Temperature of a Thermal Manikin**184
 Faming Wang, Kalev Kuklane, Chuansi Gao, Ingvar Holmér
 (Thermal Environment Laboratory, Division of Ergonomics and Aerosol Technology, Department of Design Sciences, Faculty of Engineering, Lund University, Lund, Sweden)
- 43 **Preparation of a Novel Anti-bacterial Wool Fabrics**187
 Junhua Wang¹, Zaisheng Cai²
 (1. Department of Textile and Clothes, Wuyi University, Guangdong, China
 2. College of Chemistry, Chemical Engineering and Biotechnology, Donghua University, Shanghai, China)
- 44 **Experimental Study of the High Temperature Resistant Filtration Materials Bonding by of Hydroentanglement Technique**191
 Xiangqin Wang, Lili Wu, Xiangyu Jin, Qinfei Ke
 (Key Laboratory of Textile Science & Technology, Ministry of Education, Donghua University, China)
- 45 **Study on the Intensity of Joints for the Textile Geogrids Manufactured with PET High-performance Yarn**194
 Guoping Xu¹, Xinbo Ding¹, Jian Han²
 (1. College of Material & Textile Engin., Zhejiang Sci-Tech University, Hangzhou, China
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na
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Hollow
.....180

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e of a
.....184

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eden)

.....187

. Shanghai,

by of
.....191

sity, China)

gh-
.....196

China
nistry of

46 Study on the Morphology, Structure and Mechanical Performances of Electrospun Aligned PAN/Activated Carbon Nanofiber2

Hua Xue, Ni Li, Jie Xiong, Guan Feng Liu

(Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)

47 Effect of Fabric Structure on the Sound Insulation Property of Honeycomb Weave Fabric/PVC Composites Material2

Tianbing Yang¹, Yaofeng Zhu², Bangyong Pang¹, Jin Wang¹, Hao Cen¹, Liyuan Zhang¹,
Yaqin Fu¹

(1. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China
2. Graduate School of Science and Technology, Shinshu University, Japan)

48 Synthesis of Nitrogen/phosphorus/silicon Composite Flame Retardant and Its Charring Properties in Polyester21

Lewei Zhang, Huapeng Zhang, Jianyong Chen

(Key Laboratory for Advanced Textile Materials and Manufacturing Technology, Ministry of Education, College of Materials, Zhejiang Sci-Tech University, Hangzhou, China)

49 Computer Evaluation System of Woven Fabric Smoothness Based on 2D Wavelet Transform21

Yifan Zhang, Ameersing Luximon

(Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hong Kong, China)

50 Advantages of Basalt Fiber Reinforced Concrete Structures21

Dangfeng Zhao¹, Huawu Liu¹, Zhigang Chen², Yinhua Zhang³, Dangqi Zhao⁴

(1. School of Textiles, Tianjin Polytechnic University, Tianjin, China
2. Tianjin Institute of Electronics and Information, Tianjin, China
3. Yueyang Textile Research Center, Hunan, China
4. China Water Resources and Hydropower 11th Engineering Bureau, Sanmenxia, China)

51 Fabric Drape Prediction and Simulation22

Hua Zhou, Yanfang Shao, Quan Wen

(College of Materials and Textiles, Zhejiang Sci-Tech University, Hangzhou, China)

52 Fabrication and Characterization of Mesoporous Calcium Silicate/silk Fibroin Composite Films22

Hailin Zhu^{1,2}, Xinxing Feng¹, Huapeng Zhang¹, Jianyong Chen¹

(1. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China
2. Department of Chemistry, Xiasha Higher Education Zone, Zhejiang Sci-Tech University,

Hangzhou, China)

- 53 **Comparison of Fiber Configurations between Low Torque, Compact and Ring Spun Yarns**233
Ying Guo^{1,2}, Xiaoming Tao², Bingang Xu², Jie Feng², Tao Hua², Shanyuan Wang¹
(1. College of Textiles, Donghua University, Shanghai, China
2. Institute of Textiles & Clothing, The Hong Kong Polytechnic University, Hong Kong, China)
- 54 **Hemp Processing with MAE and Alkali-H₂O₂ One-bath Treatment**238
Guojun Han, Lijun Qu, Xiaoqing Guo, Xiao Yang, Yuehua Zhao
(Laboratory of New Fiber Materials and Modern Textile, the Growing Base for State Key Laboratory, Qingdao University, Qingdao, Shandong, China)
- 55 **Design of Multicolored Warp Jacquard Fabric Based on Space Color Mixing**243
Qizheng Li, Jiu Zhou, Gan Shen, Chenyan Zhu
(College of Materials and Textiles of Zhejiang Sci-Tech University, Hangzhou, China)
- 56 **Design and Development of a Detection System for Recognising Emotions towards Creation of Interactive Fashion**247
XIA W.J., NG M.C.F.
(Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hong Kong, China)
- 57 **Design Creations of Black-and-white Simulative Effect Digital Jacquard Fabric**252
Jiu Zhou^{1,2}, Frankie NG², Yejin Jiang¹
(1. Key Lab of Advanced Textile Materials and Manufacturing Technology of Ministry of Education, Zhejiang Sci-Tech University, Hangzhou, China
2. Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hong Kong, China)
- 58 **Thickness Variations of Length-distributed Slivers and Draft Conditions in Roller Drafting**258
Jong S. Kim¹, Jung Ho Lim², You Huh³
(1. Laboratory of Intelligent Process and Control, College of Engineering, Kyunghee University, Yongin, R. O. Korea
2. Department of Textile Engineering, Graduate School, Kyunghee University, Yongin, R. O. Korea
3. Department of Mechanical Engineering, College of Engineering, Kyunghee University, Yongin, R. O. Korea)
- 59 **The Study on Comprehensive Comfort Property of Garment with Knitted Underwear Fabrics during Exercise**271
Shan Cong
(Shanghai University of Engineering Science, Shanghai, China)
- 60 **Preparation and Application of a Novel Fluoroalkylpolysiloxane Fabric Finish with Waterproofing and Washing Resistant Properties**271

Lifen Hao, Qiufeng An, Wei Xu, Qianjin Wang
(Key Laboratory of Auxiliary Chemistry and Technology for Chemical Industry, Ministry of
Education, Shaanxi University of Science and Technology, Xi'an, China)

- 61 **Research on Pattern Grading of Apparel Shoulder Slope**283
Canyi Huang¹, Lina Cui²
(1. Department of Business and Information, Quanzhou Normal University, Quanzhou, Fujian, China
2. Department of Arts and Design, Quanzhou Normal University, Quanzhou, Fujian, China)
- 62 **Study on the Elastic Recovery of PLA/Cotton Fabric**288
Peng Liu, Wei Tian, Yanqing Li, Zhaohang Feng, Chengyan Zhu
(College of Materials and Textiles, Key Laboratory of Advanced Textile Materials and Manufacturing
Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)
- 63 **Functional Properties of Hemp Union Fabrics for Home Textiles**293
Lin Lou, Xiaohang Zhu, Hongyan Xu, Jianfang Wang, Xinghai Pei, Jianliang Li
(Zhejiang Sci-Tech University, Hangzhou, China)
- 64 **Effects of Annealing Atmosphere on the Structures and Photocatalytic Properties of Gd-Doped
TiO₂/CF Photocatalysts**298
Bangyong Pang¹, Yaofeng Zhu², Tianbing Yang¹, Yaqin Fu¹, Hao Chen¹, Liyuan Zhang¹, Jin Wang¹
(1. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of
Education of China, Zhejiang Sci-Tech University, Hangzhou, China
2. Graduate School of Science and Technology, Shinshu University, Ueda, Japan)
- 65 **Study on Preparation Techniques and Function of Thermochromic Microcapsule**302
Zanmin Wu, Wenzhao Feng, Xiaozhu Sun
(Institute of Textile, Tianjin Polytechnic University, Key Laboratory of Advanced Textile Composites,
Tianjin Polytechnic University, Ministry of Education, Tianjin, China)
- 66 **The Influence of Fabric Structures on the Property of Anti-electromagnetic Radiation of Fabrics
with Embedded Silver-plated Fibers**307
Hongxia Zhang, Zhilei Chen, Lijia Shi, Yanqing Li
(Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of
Education of China, Zhejiang Sci-Tech University, Hangzhou, China)
- 67 **Study on the Patterns of Small Black-and-white Grid in Costumes**312
Jian Zhao, Cai Qian Zhang
(Textile and Apparel Institute, Shaoxing University, Shaoxing, Zhejiang, China)
- 68 **Thermodynamics Study of Monomer Adsorption Process for Fabrication of Conductive
Textiles**316
Yaping Zhao¹, Zhaoyi Zhou², Xiaolan Fu¹, Zaisheng Cai¹
(1. College of Chemistry, Chemical Engineering & Biotechnology, Donghua University,

Shanghai, China

2. Shanghai Institute of Fibre Inspection, Shanghai, China)

- 69 **An Analytical Model for Ballistic Impact on Textile Based Body Armour**321
Fuyou Zhu¹, Xiaogang Chen¹, Garry Wells²
(1. Textiles and Paper, School of Materials, University of Manchester, Manchester, UK
2. Physical Science Department, Dstl, Porton Down, Salisbury, Wiltshire, UK)
- 70 **Study on Automatic Classification of Size Designation in Clothing MC Based on Improved LBG Algorithm**326
Fengyuan Zou, Li Dong, Lifeng Pan, Xiaojun Ding, Minzhi Chen
(Fashion College, Zhejiang Sci-Tech University;
Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)
- 71 **Thermodynamic Behavior on the Binding of the Polymers and Acid Dyes in Inkjet Ink for Textiles**331
Juyoung Park, Yuichi Hirata, Kunihiro Hamada
(Faculty of Textile Science and Technology, Shinshu University, Japan)
- 72 **Applications of UV Curing on Textiles**336
Shiqi Li, Henry Boyter Jr.
(Institute of Textile Technology, North Carolina State University, Raleigh, NC 27695, USA)
- 73 **A Study on the Kinetics and Thermodynamics of UV-absorber Taken Up to Polyester**344
Weiguo Chen^{1,2}, Xiaofang Wang², Son Fang², Qingqing Hu², Yining Cao²
(1. College of Chemistry and Chemical Engineering, Donghua University, Shanghai, China
2. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China)
- 74 **Improving Dyeing Behavior of PLA Fiber with Plasticizing and Solubilizing System**347
Xiaonan Dang¹, Jinhuan Zheng^{1,2}, Jianjian Fu¹
(1. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China
2. Engineering Research Center for Eco-Dyeing & Finishing of Textiles, Ministry of Education, Hangzhou, China)
- 75 **Surface Resistivity of PET/COT Fabrics Treated with 3,4-ethylenedioxythiophene via Vapor Phase Polymerization**351
Qinguo Fan^{1,2}, Okan Ala¹, Jianzhong Shao², Jinqiang Liu³
(1. Department of Materials & Textiles, University of Massachusetts, Dartmouth, USA
2. Key Laboratory of Advanced Textile Materials and Manufacturing Technology, Ministry of Education of China, Zhejiang Sci-Tech University, Hangzhou, China
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70 Study on Automatic Classification of Size Designation in Clothing MC Based on Improved LBG Algorithm*

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Abstract: Automatic classification of size designation is a difficult part in clothing MC. It needs the accumulation of years' practical experiences. With the application of the improved LBG algorithm which can simulate the technique and experience of classification into automatic classification of size designation in MC, it realizes the automatic mapping from net body-measurements of MC customers to series of size designation and improves the production efficiency of mass customization.

Keywords: Clothing MC; Classification of size designation; Vector quantization; LBG algorithm

MC (Mass Customization) mode is a completely customer-oriented and highly automatic industrialized method of production. It is the outcome of the development of applying modern science and technology and new consumption patterns into the garment industry and is one of the areas which have the broadest prospect in this field^[1]. The core of MC is to identify and seek out the garment specification and pattern which are matched with individuals best according to the data information of the customers' bodies, and thus to produce the clothing that perfectly fits customers' body figures^[2]. However, since the generation of series of size designation in MC is generally by manual work with low accuracy rate and slow efficiency, the research on how to obtain the automatic classification through the application of technology becomes one of the keys to achieve a high degree of automation of clothing MC.

Through the abstract and mathematical description of the issue of classification by vector quantization technology, this paper constructs the mathematical model of classification of size designation in MC. Based on analyzing the flow-chart of classical LBG algorithm, it puts forward the improved algorithm based on LBG and thus accomplishes the process of automatic classification of size designation in clothing MC.

1 Mathematical models

1.1 The principle of classification of size designation

One size designation includes the data of "m" parts of human body and the total number of sizes designations stored in the size designation data-base of MC clothing enterprises is "K". Now the number of the given people who need clothing MC is "n". This crowd is divided into "k" groups. Then corresponding to these "k" groups, "k" size designations are selected from the size designation data-base containing "K" number of size designations. The selected "K" size designations represent the size designation of each group of clothing MC. The division of the crowd and the choice of size designation should make each group have the best adaptability to the size designation of its own group, and make the classification of size designation most optimal from the overall point of view^[3].

Size designation in the size designation data-base and net body-measurements awaiting classification are regarded as m-dimensional vector, then the template vector of size designation data-base and sample vector can be respectively expressed as: $R = (r_1 \ r_2 \ \dots \ r_m)^T$ and $S = (s_1 \ s_2 \ \dots \ s_m)^T$. Under the demand of body-fitness, dimensionality weighting calculation is applied to each vector according to the weight of each control position: $S' = (w_1 s_1, w_2 s_2, \dots, w_m s_m)^T$ and $R' = (w_1 r_1, w_2 r_2, \dots, w_m r_m)^T$ ^[4]. Then it is classified according to the nearest neighbor rule, $\{S' | S' \in \Phi_i \text{ where } d[S', R'_j] = \min d[S', R'_j] \ j = 1, 2, \dots, m\}$, when S belongs to Φ_i and $d = w_1^2 (r_1 - s_1)^2 + w_2^2 (r_2 - s_2)^2 + \dots + w_m^2 (r_m - s_m)^2$ here^[5].

Thus classification of size designation in MC will be abstractly expressed as: there are "n" number of

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m-dimensional sample muster $\{S_i | S_i \in \Phi \ i=1,2,\dots,n\}$ and "K" number of template muster $\{R_1, R_2, \dots, R_K\}$. The sample muster is to be divided into "k" groups $\Phi_1, \Phi_2, \dots, \Phi_k$ ($k < K$), and pick "k" template vector from template muster to be corresponding to each group. The aberration d_i in each group when S belongs to Φ_i should be minimized and make the total aberration $d = \sum d_i$ minimum.

1.2 Vector Quantization

The classification of size designation in MC is just aiming to find ways to complete the issue of vector mapping, i.e. mapping a group of m-dimensional vector to another group of m-dimensional vector, which is known as VQ (Vector Quantization, VQ for short). Its mathematical equation is $R_j = Q(S_i)$ [6].

The principles of encoding part of sending-end of VQ is equal to the abstract mathematical description of classification of garment size designation need to be solved. After VQ encoding, one input vector obtains the serial number representing one code word. Then in decoding-end, it is restored to the corresponding code word according to the serial number and output. Certain distortion must exist between the input and output. As far as a group of input vector is concerned, the smaller the average distortion between input and output is, the better the effect of the VQ will be. Hence it needs to find a most optimal VQ quantizer with minimum average distortion, i.e. the most high quality code book [7].

2 Improved LBG algorithm and automatic size-classification method

2.1 Improved LBG algorithm

LBG algorithm is a classic VQ method, also known as K-means algorithm. It can acquire fairly satisfactory code book by several times of iterations, assortments, and seeking center of mass operations based on given training samples. The design of code book in LBG algorithm is based on the following two principles:

1) Nearest neighbor rule. The optimal classification of training vector set can be obtained through mapping each training vector to the code word nearest to its spatial Euclidean distance. It is supposed that a space vector muster is divided into "k" groups and each group is labeled as Φ_i . When the vector S belongs to Φ_i $\{S | S \in \Phi_i \text{ where } d[S, R_i] = \min d[S, R_j]\}$ $j = 1, 2, \dots, k$

2) Centroid assortment condition. After each classification, the sort centre will be redefined. The centre is figured by the centroid of all training vectors in this sort. If there are n_i number of vectors in the i

group, the center of mass of this sort is: $R_i = \frac{1}{n_i} \sum_{j=1}^{n_i} S_j$

Generally there are two ways to choose the initial code book: random method and split method. The former one is to randomly select "k" training vectors as the initial code word. The latter is in the hope to expand the distance among the code words as far as possible in order to get better effect of initial classification [8].

The theory of LBG algorithm is strict and easy to implement. It has become the basis of many other improved algorithm. After the initial code book is selected, the initialization condition is set, that is, supposing the number of initial iteration is $m=0$ or 1; the total number of iteration is L ; the average distortion i.e. total aberration of each classification is $D_{total}^m \rightarrow \infty$; the threshold of distortion control is $0 < \delta < 1$, in which δ is relative distortion generated from the need of procedure control, and it reflects the extent of reduction between total aberration of two adjacent classifications. If it is less than δ , the procedure ends. Generally we set that $\delta = 0.001$. The chart of improved algorithm based on LBG is shown in Figure 1.

The improved algorithm based on LBG adds one process, that is, mapping the code book to the template vector after the initialized code book is confirmed. Besides, when the new code book is produced after each iteration, the process of mapping the new code book to the template vector is also added. Thus it makes LBG algorithm more conforming to the practical significance of classification of size-designation in MC.

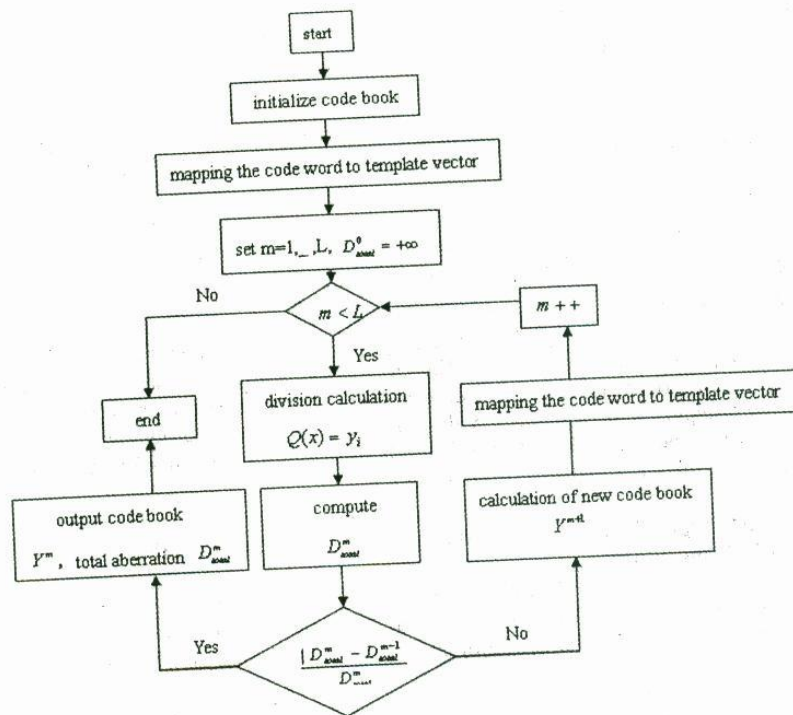


Figure 1 The flow-chart of improved algorithm based on LBG

2.2 Automatic classification method

1) Data pre-processing. As the classic method, first, the dimensionality weighting treatment is applied to the input data of net body measurements (total number of "n") and data of control positions in the garment size designation data-base (the total number of "K").

2) By adopting random method or split method, the code book including "k" initial codes is obtained from the sample muster. Then following nearest neighbor rule, the code book is mapped to unrepeated "K" template vectors. Later, the circular iterative process of improved LBG algorithm works until the last iteration stops and final result is output.

3) It can be known from the content of the algorithm that the final output result of improved algorithm is the final size designation of classification of size designation in MC that is pursued. The use of nearest neighbor rule can map all "n" samples to "k" size designations. Thus the classification of size designation based on improved algorithm completes.

The output code book based on improved algorithm is a subset of the template of the size designation data-base, i.e. the result we seek.

3 Application

3.1 To determine the part of input data

The part of input data includes size designation data-base of MC and the input of samples under test. In this study, the size designation data-base of MC includes 98 size designations containing 16 control positions data, such as 160/84AF2B2. Here 160/84 represents the series of size designation and Y, A, B, C is the national standard body-figures. F represents the Front-side shape and B represents the Back-side figure. 1, 2, 3 represent respectively three protuberance positions from top to bottom. Thus we get the identifications of body-figure subdivisions in the size designation data-base of MC. According to the requirement of body-fitness, 16 control positions which can reflect the characteristics of each body-figure subdivisions include: body height, back neck point height, front length, back length, arm length, waist height, chest height, the front crotch length, the back crotch length, the shoulder width, neck circumference, the front bust, the



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Abstract: This article analyzed different filament amount and twists effect on the CCFs' conductivity and stability of resistance under different elongation, and observed the surface of CCFs by SEM. The study demonstrated: In the initial state, the experimental resistance value of CCFs' is close to the theoretical one; The conductivity would improve as the number of filament and twist adding; The relationship between resistance and elongation varies differently in two periods during the stretching: within 0-6mm, CCFs' varies of resistance is more stable, but unsteadily within 6-15mm, and the coat of some samples began to break off. © (2011) Trans Tech Publications.

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The Change of Amount and Twists Effect to Electrical Performance of Carbon-coated Filaments

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Keywords: Carbon-coated Filaments (CCFs), Filament Amount, Twists, Elongation, Electrical Performance.

Abstract. This article analyzed different filament amount and twists effect on the CCFs' conductivity and stability of resistance under different elongation, and observed the surface of CCFs by SEM. The study demonstrated: In the initial state, the experimental resistance value of CCFs' is close to the theoretical one; The conductivity would improve as the number of filament and twist adding; The relationship between resistance and elongation varies differently in two periods during the stretching: within 0-6mm, CCFs' varies of resistance is more stable, but unsteadily within 6-15mm, and the coat of some samples began to break off.

Introduction

Recently, most smart clothings can be used to monitor physiological signals of body, and the study of smart clothing which embedded conductive fibers became more and more popular. [1] So far, two methods are usually used to produce conductive fibers: 1. Blending metal fibers with common fibers [2]; 2. Coating the common fibers with conductive material [3]. Metal fibers have lower spinnability, because the surface of fibers is smooth. The common coated fiber has a better spinnability but has the drawback that the coating is nonuniform and easily to peel off, they are neither wear-proof nor water-proof. Generally, these functional fiber sensors have worse repeatability because of the limited elastic deformation, so different yarn structure and different textile structure can be used to improve the conductive performance of textile sensor.

In this paper, we use a conductive and wear-resistant carbon-coated flexible washable filament which is produced by Kanebo Company of Japan (Kanebo) and named Belltron 9R1, it is black and consisting of 3 single twistless filaments. The single filament is made by mixing conductive Carbon powder with melting nylon6, resistivity $\rho=7.8 \times 10^2 \Omega \cdot \text{mm}$, 22.2dex/3F, elongation rate 53.2%. With different filament amount and twists, conductivity of yarn and resistance stability was analyzed by measuring resistance change under different elongation.

Experiment

According to GBT2543.2-2001, we design different amount and twists of CCFs and use Y331LN/PC digital yarn-twisted instrument to produce carbon-coated different structure of yarns. Sample specification is showed in Table 1. F was expressed as number of filament.

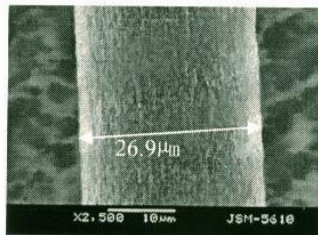
Tab.1 The specification of samples

Sample number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CCFs amount (F)	3	6	9	12	24	6	12	24	6	12	24	6	12	24
Twist (twists/m)	0					150			300			450		

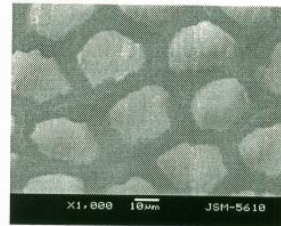
We collected resistance of samples during the stretching with Fluke 289 digital multimeter in the constant temperature and humidity indoor. Choose the NO.1-5 samples to measure the resistance under the initial state (non-tensile). The length is 100mm. Recorded the resistance of 5mm as the beginning resistance, and added 5mm longer each time as the next value. Each kind of sample prepared five. The resistances of all samples were measured during the stretching progress. Each kind of sample prepared five too. And we use Shimadzu AG-1 Electronic Strength Tester to do the tensile testing, speed is 10mm/min. The length of sample is 150mm, including the testing part, 50mm. The resistance was recorded after stretching 1mm each time until collecting 15 vaules.

Results and Discussion

Morphology of non-tensile carbon-coated filament. The coated surface of single carbon-coated filament was shown in Figure 1 (a), the diameter is about $26.9\mu\text{m}$. We can see from the graph that the surface was uneven, and this uneven surface can increase the frictional coefficient in the yarn. In general, the coating is uniform, continuous, and non-porous. Figure 1 (b) is the cross-section of multiple filaments which were arranged closely and the coating is deformed due to the compression between filaments.



(a) SEM graph of filament's surface



(b) SEM graph of filaments' cross section

Fig.1 SEM graph of filament's surface and filaments' cross section

Morphology of stretched carbon-coated filament. The surface of filament under stretching in three states, 12%, 30% and after fracturing, by SEM were show in Figure 2 (a) (b) (c) respectively. From the figure, we can see that the leakage of base is not obvious when the carbon-coated filament was stretched to 12%. As the stretching rate increasing, the coating started to crack, the coating base began to leak and the distribution of coating is discrete. When the filament was fractured, the leakage of base is more obvious than before. The distribution of coating became discontinuous due to large stretch, and the resistance increased gradually because that the distance of conductive particles became larger^[4-7].

Non-tensile Test. Figure 3 showed the relationship between resistance and the length of carbon-coated filament, and the linear regression analysis corresponding shown in Table 2. From the Figure 3 and Table 2, the linear relationship between resistance and length is significant on non-stretched carbon-coated filament which demonstrates that the trend of resistance growing is

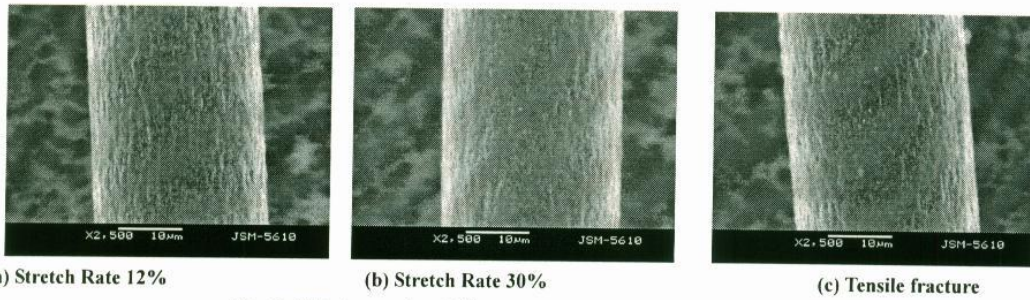


Fig.2 SEM graph of filament's surface after straining stable as the testing length is increasing. And the resistance decreases evidently with the amount of filaments increases.

Tab.2 linear equation between R & L (y:MΩ, x:mm)

Number(F)	Linear Regression	r ²
3F	y=1.1238x+2.3200	0.9988
6F	y=0.5210x-1.4886	0.9976
9F	y=0.3149x+0.5598	0.9972
12F	y=0.2317x+0.4261	0.9964
24F	y=0.1164x+0.0369	0.9912

The resistance of yarns combined by the CCFs can be seen as several single resistances paralleling [8]. Determined by the formula of resistance which was used in the columniform and even materials, $R_0 = \rho L / S$ and the formula of the parallel resistance, $R_2 = R_0 / F$. We can deduce the R_2 , $R_2 = \rho L / SF$. The cross-sectional area $S=2.15 \times 10^{-4} \text{mm}^2$ can be calculated by the diameter of filament. After then, we can deduce the theoretical formula as follows, unit: $M\Omega$: $R_2=3.6279L/F$ (1)

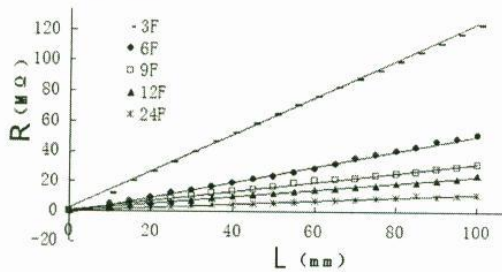


Fig.3 filaments length VS resistance

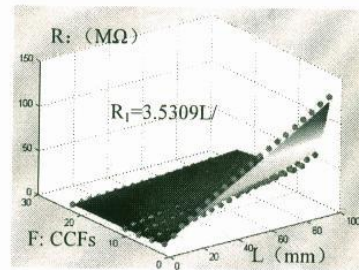


Fig.4 surface fitting

According to surface fitting by the experimental data of resistance, filament number F , the length L under the state of no-tension, we obtained that: $R_1=3.5309L/F$, unit: $M\Omega$. The results show that, the experimental resistances of carbon-coated filament and the theoretical one are close, as shown in Figure 4.

Filament amount effects on the conductivity in tensile test. Studies have shown that tensile force can affect the conductivity of conductive fiber [4-7]. Due to the different processing and structural parameters, the variational trends of resistance will be different in three stages [4] or two stages [5] commonly.

We do strain-resistance test on 1-5 samples with non-twist, the relationship between resistance and strain rate. The more number of filaments, the smaller the resistance, and the conductivity are better. The reason is that the more the number of filaments, the more parallel channels is formed [9]. Liner fitting to the experimental results in two segments, we found that using 6mm as a divided

point can make the r^2 as a maximum one after calculating. Thus the variational trends of resistance can be divided into two stages: the trend is stable in the phase of 0-6mm and the resistance changes quickly in the 6-15mm.

Table 3 is the regression model of the relationship between resistance and tensile rate, in which, the y is resistance: R ($M\Omega$), the x is strain rate: $\Delta L/L_0$ (%). We can conclude from Table 3: in the two tension ranges, 0-15mm and 0-6mm, the linear regression coefficient of NO.5 sample is much smaller than that of NO. 1-4, and it indicates that the conductivity of 24F is the best; In the tension range of 0-15mm, the r^2 value of NO.5 is evidently higher than that of NO.1-4, indicating that the extent of linear fitting of 24F is better than that of 3F,6F,9F and 12F, and the ratio of resistance change is most stability; In the tension range of 0-6mm, the value of r^2 is close to 1 and the good extent of fitting indicate that the relationship between resistance and tensile rate of all samples is close to a linear evidently, and the resistance change is stable during the whole tension.

Tab.3 Resistance vs Stretch Rate

Sample Number	Resistance VS Strain ratio			Resistance VS Strain ratio		
	Strain length 0-15mm	regression	r2	Strain length 0-6mm	regression	r2
1	$y=16.122x-17.619$	16.122	0.913	$y=6.645x+49.504$	6.645	0.995
2	$y=13.320x-37.735$	13.320	0.802	$y=4.652x+31.175$	4.652	0.995
3	$y=5.002x+1.038$	5.002	0.928	$y=2.593x+18.314$	2.593	0.985
4	$y=4.647x+8.269$	4.647	0.916	$y=3.107x+16.214$	3.107	0.985
5	$y=0.703x+7.429$	0.703	0.987	$y=0.807x+7.086$	0.807	0.989

Filament twists effect on the conductive performance of in tensile test. The relationship between resistance and stretch rate of CCFs of different twists such as 6F, 12F and 24F are shown in the Figure 6 (a) (b) (c). Theoretically, the more twists the greater the convolution of single filament is, and the better conductivity has because of the conductive filament can form a continuous structure of conduction [10]. Figure 6 shows the resistance will be smaller as the more filaments, the same results is shown in Figure 5, and the more the twists of CCFs are, the smaller resistance is.

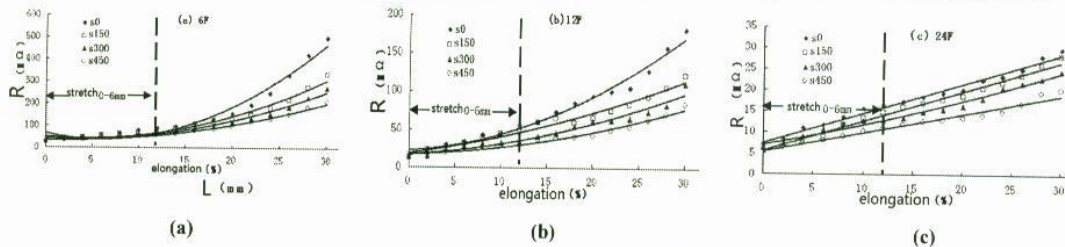


Fig.6 Resistance vs Stretch Rate

Tab.4 Resistance vs Stretch Rate ($y:R$ ($M\Omega$) $x:\Delta L/L_0$ (%))

sample	R VS $\Delta L/L_0$		R VS $\Delta L/L_0$		samples	R VS $\Delta L/L_0$		R VS $\Delta L/L_0$	
	Strain length	r^2	Strain length	r^2		Strain length	r^2	Strain length	r^2
6Fs0	$y=13.320x-37$	0.802	$y=4.652x+31$	0.995	12Fs3	$y=2.478x+12.111$	0.891	$y=1.837x+14.0$	0.917
6Fs150	$y=8.411x-2.64$	0.848	$y=3.698x+34$	0.978	12Fs4	$y=1.859x+12.443$	0.895	$y=1.504x+13.5$	0.981
6 F s300	$y=6.926x+2.11$	0.867	$y=3.132x+31$	0.993	24Fs0	$y=0.703x+7.429$	0.987	$y=0.807x+7.08$	0.989
6 F s450	$y=5.440x+6.86$	0.893	$y=2.566x+28$	0.981	24Fs1	$y=0.707x+5.579$	0.988	$y=0.725x+5.60$	0.954
12 F s0	$y=4.647x+8.26$	0.916	$y=3.107x+16$	0.985	24Fs3	$y=0.573x+6.329$	0.978	$y=0.618x+6.40$	0.963
12 F150	$y=2.956x+15.8$	0.932	$y=2.800x+14$	0.995	24Fs4	$y=0.449x+5.377$	0.968	$y=0.436x+5.61$	0.989

In the Table 4, there is a linear regression model between the relationship of resistance R and the strain rate of different samples which contain different amounts, 6F, 12F and 24F, in two tensile ranges, 0-6mm (0-12%) and 0-15mm (0-30%). Table 4 shows that, with the amount of filament and twist increasing, the regression coefficient decreased gradually. It indicated that the resistance decreases, conductivity enhancement; in tensile range of 0-15mm, the r^2 of samples, 12F s0 and 12F

s150, are larger than 0.900, But the r^2 of all samples are larger than 0.900 in tensile range of 0-6mm. It indicated that the degree of linear fitting is better, and the resistance change is stable.

Conclusion

In the initial (non-stretching) state, the experimental resistance $R_1=3.5309L/F$ is very close to theoretical one $R_2=3.6279L/F$. The variational trends of resistance present differently in two-stage during the tensile process: the resistance change is stable between the elongation of 0-6mm, but increased between in 6-15mm. Adding the twists and the amount of filament would improve the conductivity of CCFs. In the elongation of 0-15mm, sample that contains 12F and has the twist of s0 or s150 would improve conductivity and the stability of resistance; if the CCFs contain 24F, it's not necessary to consider the influence of twists. But in the elongation of 0-6mm, twists will be not consider necessarily, adding the amount of CCFs could improve the conductive of the yarn.

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