

测试报告

No. SHAEC1808924204

日期: 2018年05月11日 第1页,共17页

上海复旦微电子集团股份有限公司

上海市杨浦区国泰路127号4号楼

以下测试之样品是由申请者所提供及确认: IC-1

SGS工作编号: SP18-014058 - SH

型号: SOP PACKAGE-G

样品接收日期: 2018年05月02日

测试周期: 2018年05月02日 - 2018年05月07日

测试要求: 根据客户要求测试

测试方法: 请参见下一页

测试结果: 请参见下一页

结论: 基于所送样品进行的测试, 镉、铅、汞、六价铬、多溴联苯(PBBs)、多溴二苯醚(PBDEs)、邻苯二甲酸酯(如邻苯二甲酸二丁酯 (DBP)、邻苯二甲酸丁苄酯(BBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)和邻苯二甲酸二异丁酯(DIBP))的测试结果符合欧盟RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863的限值要求。

通标标准技术服务(上海)有限公司
授权签名

胡敏

Dora Hu 胡敏
批准签署人

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测试结果:

测试样品描述:

样品编号	SGS样品ID	描述
SN1	SHA18-089242.002	黑色本体带印字
SN2	SHA18-089242.024	银色金属引脚

备注:

- (1) 1 mg/kg = 0.0001%
- (2) MDL = 方法检测限
- (3) ND = 未检出 (< MDL)
- (4) "-" = 未规定

RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863

测试方法: 参考IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013, IEC 62321-7-2:2017, IEC 62321-6:2015和IEC 62321-8:2017, 采用ICP-OES, UV-Vis和GC-MS进行分析。

测试项目	限值	单位	MDL	002
镉(Cd)	100	mg/kg	2	ND
铅(Pb)	1000	mg/kg	2	ND
汞(Hg)	1000	mg/kg	2	ND
六价铬 (Cr(VI))	1000	mg/kg	8	ND
多溴联苯之和(PBBs)	1000	mg/kg	-	ND
一溴联苯	-	mg/kg	5	ND
二溴联苯	-	mg/kg	5	ND
三溴联苯	-	mg/kg	5	ND
四溴联苯	-	mg/kg	5	ND
五溴联苯	-	mg/kg	5	ND
六溴联苯	-	mg/kg	5	ND
七溴联苯	-	mg/kg	5	ND
八溴联苯	-	mg/kg	5	ND
九溴联苯	-	mg/kg	5	ND
十溴联苯	-	mg/kg	5	ND
多溴二苯醚之和(PBDEs)	1000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND
二溴二苯醚	-	mg/kg	5	ND
三溴二苯醚	-	mg/kg	5	ND



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测试项目	限值	单位	MDL	002
四溴二苯醚	-	mg/kg	5	ND
五溴二苯醚	-	mg/kg	5	ND
六溴二苯醚	-	mg/kg	5	ND
七溴二苯醚	-	mg/kg	5	ND
八溴二苯醚	-	mg/kg	5	ND
九溴二苯醚	-	mg/kg	5	ND
十溴二苯醚	-	mg/kg	5	ND
邻苯二甲酸二丁酯 (DBP)	1000	mg/kg	50	ND
邻苯二甲酸丁苄酯(BBP)	1000	mg/kg	50	ND
邻苯二甲酸二(2-乙基己基)酯(DEHP)	1000	mg/kg	50	ND
邻苯二甲酸二异丁酯(DIBP)	1000	mg/kg	50	ND

备注:

(1) 最大允许极限值引用自RoHS指令(EU) 2015/863。

IEC 62321 系列等同于 EN 62321 系列

http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25

(2) 2015年6月4号发表在欧盟官方杂志(官方公报)上的RoHS指令(EU) 2015/863 附录II 限值中还包括邻苯二甲酸酯BBP, DBP, DEHP和DIBP。新的指令限制了电子电器产品的每一个均一材质中邻苯二甲酸酯含量不得超过0.1%。

(3) 2021年7月22号开始, DEHP, BBP, DBP 和 DIBP的限制适用于医疗器械, 包括体外医疗器械, 监控仪表, 包括工业监测和控制仪器。

(4) DEHP, BBP, DBP 和 DIBP的限制不适用于2019年7月22日前投放市场的电缆及电子电气产品中用于维修、重复利用、功能更新及容量提升的备用配件以及2021年7月22日前投放市场的医疗器械, 包括体外医疗器械, 监控仪表, 包括工业监测和控制仪器。

(5) DEHP、BBP 和 DBP的限制不适用于玩具产品, 因为No.1907/2006附录XVII第51条已对玩具产品中的DEHP、BBP 和 DBP含量进行了限制。

RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863

测试方法: 参考IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013和IEC 62321-7-1:2015, 采用ICP-OES, AAS和UV-Vis进行分析。

测试项目	限值	单位	MDL	024
镉 (Cd)	100	mg/kg	2	ND
铅(Pb)	1000	mg/kg	2	5
汞 (Hg)	1000	mg/kg	2	ND
六价铬(Cr(VI))▼	-	µg/cm²	0.10	ND

备注:



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(1) 最大允许极限值引用自RoHS指令(EU) 2015/863。

IEC 62321 系列等同于 EN 62321 系列

http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25

(2) ▼ = a. 当六价铬的浓度高于0.13 µg/cm²时, 样品为阳性, 即含有六价铬;

b. 当六价铬的浓度为ND(低于0.10 µg/cm²)时, 样品为阴性, 即未检测到六价铬;

c. 当六价铬的浓度介于0.10 µg/cm²与0.13 µg/cm²之间时, 无法直接判定是否检测到六价铬, 因不同个体的样品表面差异可能会影响测定结果;

由于未获知样品的存储条件和生产日期, 样品的六价铬测试结果仅能代表测试时样品含六价铬的状态。

元素

测试方法: 参照US EPA 方法3052:1996测定, 采用ICP-OES进行分析。

测试项目	单位	MDL	002
锑(Sb)	mg/kg	10	ND

卤素

测试方法: 参照EN 14582: 2016方法 测定, 采用 IC进行分析。

测试项目	单位	MDL	002
氟 (F)	mg/kg	50	ND
氯 (Cl)	mg/kg	50	ND
溴 (Br)	mg/kg	50	ND
碘 (I)	mg/kg	50	ND

多氯萘(PCNs)

测试方法: 参照US EPA 8081B: 2007 方法测定, 采用GC-MS进行分析。

测试项目	单位	MDL	002
2-氯萘	mg/kg	5	ND
1,4-二氯萘	mg/kg	5	ND
1,5-二氯萘	mg/kg	5	ND
1,2-二氯萘	mg/kg	5	ND
1,8-二氯萘	mg/kg	5	ND



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测试项目	单位	MDL	002
1,2,3-三氯苯	mg/kg	5	ND
1,2,3,4-四氯苯	mg/kg	5	ND
1,2,3,4,6-五氯苯	mg/kg	5	ND
八氯苯	mg/kg	5	ND
1-氯苯	mg/kg	5	ND

短链氯化石蜡(SCCP)(C₁₀-C₁₃)

测试方法: 参照ISO 18219: 2015 方法测定, 采用GC-NCI-MS进行分析.

测试项目	单位	MDL	002
短链氯化石蜡(SCCP) (C ₁₀ -C ₁₃)	mg/kg	50	ND

四溴双酚-A

测试方法: 参照 US EPA 3540C: 1996 方法测定, 采用GC-MS进行分析.

测试项目	单位	MDL	002
四溴双酚-A	mg/kg	10	ND

多氯三联苯(PCTs)

测试方法: 参照US EPA 8082A: 2007 方法测定, 采用GC-MS进行分析.

测试项目	单位	MDL	002
Aroclor 5432	mg/kg	5	ND
Aroclor 5442	mg/kg	5	ND

邻苯二甲酸酯

测试方法: 参考IEC 62321-8: 2017, 用GC-MS测定邻苯二甲酸酯的含量.



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测试项目	CAS NO.	单位	MDL	002
邻苯二甲酸二异壬酯 (DINP)	28553-12-0 /68515-48-0	mg/kg	50	ND
邻苯二甲酸二辛酯 (DNOP)	117-84-0	mg/kg	50	ND
邻苯二甲酸二异癸酯 (DIDP)	26761-40-0 /68515-49-1	mg/kg	50	ND
邻苯二甲酸二(2-甲氧基乙基)酯(DMEP)	117-82-8	mg/kg	50	ND
邻苯二甲酸二正己酯(DHP, DHxP)	84-75-3	mg/kg	50	ND
邻苯二甲酸二戊酯(DnPP)	131-18-0	mg/kg	50	ND
邻苯二甲酸二苯酯(DPhP)	84-62-8	mg/kg	50	ND
邻苯二甲酸二甲酯(DMP)	131-11-3	mg/kg	50	ND
邻苯二甲酸二乙酯(DEP)	84-66-2	mg/kg	50	ND
邻苯二甲酸二环己酯(DCHP)	84-61-7	mg/kg	50	ND
邻苯二甲酸二异戊酯(DiPP)	605-50-5	mg/kg	50	ND
邻苯二甲酸二C6-C8支链烷基酯(DIHP)	71888-89-6	mg/kg	50	ND
1,2-苯二甲酸, 二(C6-10)烷基酯 / 1,2-苯二甲酸, 混合二己二辛二癸酯, 其中邻苯二甲酸二己酯含量≥0.3%	68515-51-5, 68648-93-1	mg/kg	50	ND
邻苯二甲酸二(C7,C9,C11)烷基酯 (DHNUP)	68515-42-4	mg/kg	50	ND
邻苯二甲酸二壬酯(DNP)	84-76-4	mg/kg	50	ND

多环芳香烃(PAHs)

测试方法: 参考AfPS GS 2014:01 PAK 方法测试, 采用 GC-MS 进行分析.

测试项目	单位	MDL	002
苯并(a)芘 (BaP)	mg/kg	0.1	ND
苯并(e)芘 (BeP)	mg/kg	0.1	ND
苯并(a)蒽 (BaA)	mg/kg	0.1	ND
苯并(b)荧蒽 (BbF)	mg/kg	0.1	ND
苯并(j)荧蒽 (BjF)	mg/kg	0.1	ND
苯并(k)荧蒽 (BkF)	mg/kg	0.1	ND
屈 (CHR)	mg/kg	0.1	ND
二苯并(a,h)蒽(DBA)	mg/kg	0.1	ND
苯并(g,h,i)花(二萘嵌苯) (BPE)	mg/kg	0.1	ND
茚并(1,2,3-c,d)芘 (IPY)	mg/kg	0.1	ND
蒽(ANY)	mg/kg	0.1	ND
蒽(萘嵌戊烷) (ANA)	mg/kg	0.1	ND
芴 (FLU)	mg/kg	0.1	ND
菲 (PHE)	mg/kg	0.1	ND
芘 (PYR)	mg/kg	0.1	ND



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测试项目	单位	MDL	002
蒽 (ANT)	mg/kg	0.1	ND
荧蒽 (FLT)	mg/kg	0.1	ND
7项多环芳香烃总和[苊烯(ANY),苊(蔡嵌戊烷) (ANA),苊 (FLU),菲 (PHE),苊 (PYR),蒽 (ANT),荧蒽 (FLT)]	mg/kg	-	ND
萘 (NAP)	mg/kg	0.1	ND
18项多环芳香烃总和	mg/kg	-	ND

AFPS(德国产品安全委员会):GS 认证对多环芳香烃的要求

参数	1 类	2 类		3 类	
	设计意图为放入口中的材料或者玩具上与皮肤接触的材料 (接触时间大于30秒).	未在 1 类规定中涵盖的材料,且可能与皮肤接触时间大于 30 秒的材料 (长时间接触皮肤)或频繁接触皮肤.		未在 1 和 2 类规定中涵盖的材料,且可能与皮肤接触的少于 30 秒的材料(短期接触皮肤)	
		2009/48/EC 中适用的玩具	产品安全法涉及的其他产品	2009/48/EC中适用的玩具	产品安全法涉及的其他产品
苯并(a)苊 (BaP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(e)苊 (BeP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(a)蒽 (BaA) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(b)荧蒽 (BbF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(j)荧蒽 (BjF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(k)荧蒽 mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
屈 (CHR) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
二苯并(a,h)苊 (DBA)mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(g,h,i)花(二蔡嵌苯) (BPE)n mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
茚苯(1,2,3-c,d)苊 (IPY) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苊烯(ANY), 苊(蔡嵌戊烷) (ANA), 苊 (FLU), 菲 (PHE), 苊 (PYR), 蒽 (ANT), 荧蒽 (FLT)之和 mg/kg	< 1 (总和)	< 5 (总和)	< 10 (总和)	< 20 (总和)	< 50 (总和)
萘 (NAP) mg/kg	< 1	< 2		< 10	
18 PAH之和	<1	< 5	< 10	< 20	< 50

全氟辛烷磺酸 (PFOS)和全氟辛酸(PFOA)

测试方法: 参照US EPA 3550C: 2007. 采用HPLC-MS测试.



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测试报告

No. SHAEC1808924204

日期: 2018年05月11日

第8页,共17页

测试项目	限值	单位	MDL	002
全氟辛烷磺酸(PFOS)及衍生物 [^]	1000	mg/kg	10	ND
全氟辛酸 (PFOA)	-	mg/kg	10	ND

备注:

- (1) 最大允许限制引用自(EC) No. 850/2004 的修订指令欧盟决议(EU) No. 757/2010.
- (2) [^]= PFOS 包含全氟辛烷磺酸(PFOS), 全氟辛基磺酰胺(PFOSA), 2-(N-乙基全氟辛基磺酰胺)乙醇(EtFOSE), N-甲基全氟辛烷磺酰胺(MeFOSE), N-乙基全氟辛烷磺酰胺(EtFOSE)和2-(N-甲基全氟辛基磺酰胺)乙醇(MeFOSE)。

多氯联苯(PCBs)

测试方法: 参照US EPA 8082A: 2007 方法测定, 采用GC-MS进行分析.

测试项目	CAS NO.	单位	MDL	002
2,4,4'-三氯联苯 (PCB 28)	7012-37-5	mg/kg	0.5	ND
2,2',5,5'-四氯联苯 (PCB 52)	35693-99-3	mg/kg	0.5	ND
2,2',4,5,5'-五氯联苯(PCB 101)	37680-73-2	mg/kg	0.5	ND
2,3',4,4',5-五氯联苯(PCB 118)	31508-00-6	mg/kg	0.5	ND
2,2',3,4,4',5'-六氯联苯 (PCB 138)	35065-28-2	mg/kg	0.5	ND
2,2',4,4',5,5'-六氯联苯 (PCB 153)	35065-27-1	mg/kg	0.5	ND
2,2',3,4,4',5,5'-七氯联苯 (PCB 180)	35065-29-3	mg/kg	0.5	ND

检测报告仅用于客户科研、教学、内部质量控制、产品研发等目的, 仅供内部参考。



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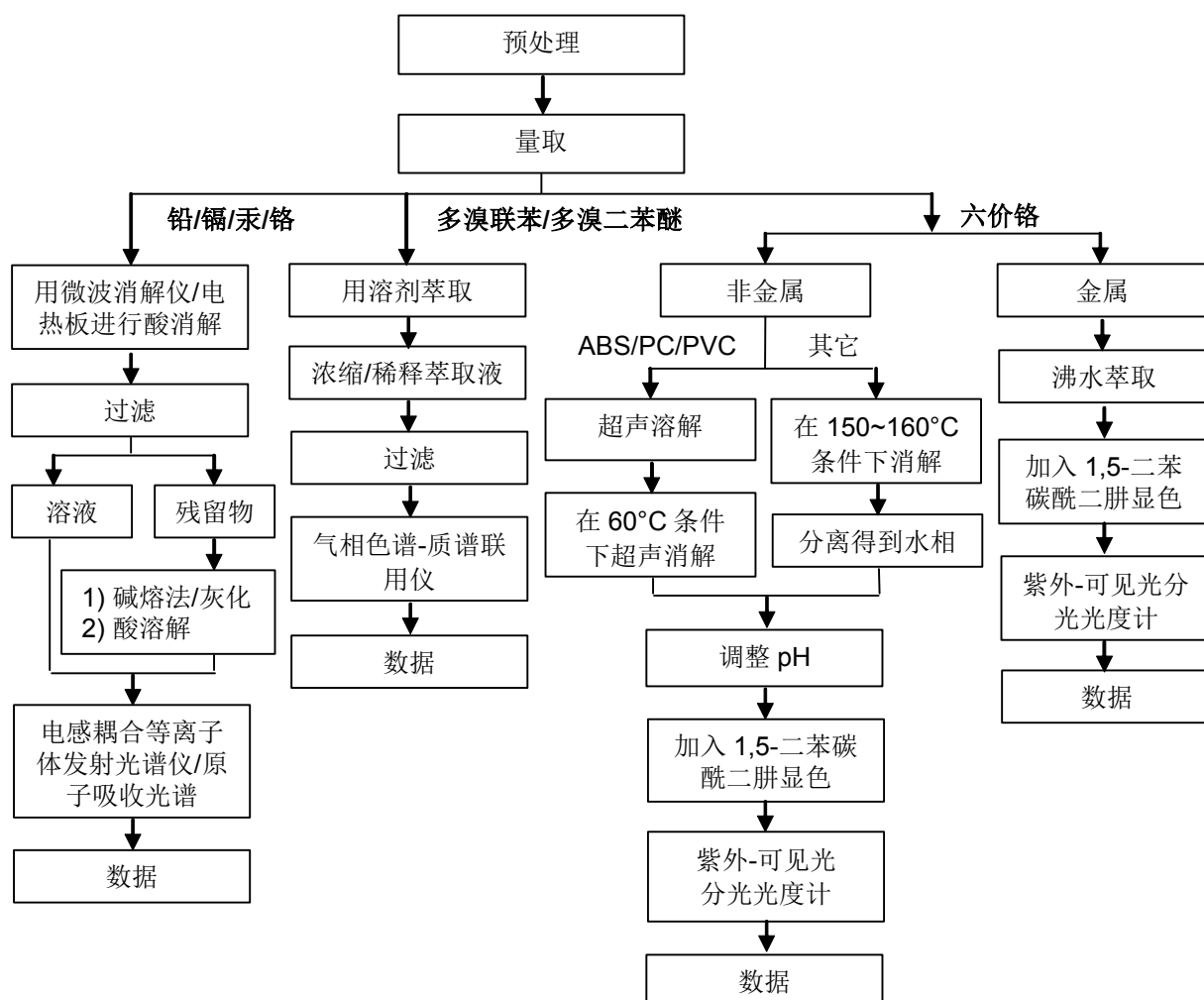
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附件

Pb/Cd/Hg/Cr⁶⁺/PBBs/PBDEs 测试流程图

- 1) 分析人员: 金叶/徐刚/杨小龙 /宋珂静
- 2) 项目负责人: 施青/马永存/徐亮/王晓艳
- 3) 样品按照下述流程被完全消解 (六价铬和多溴联苯/多溴二苯醚测试除外)。



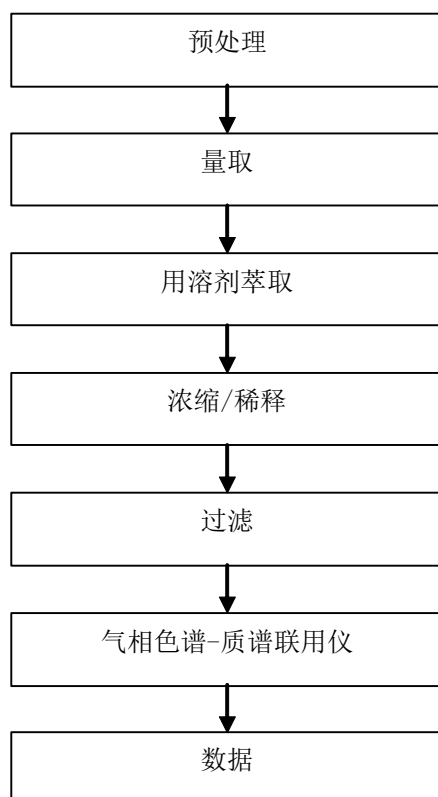
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Phthalates 测试流程图

- 1) 分析人员: 高仰景
- 2) 项目负责人: 黄婷



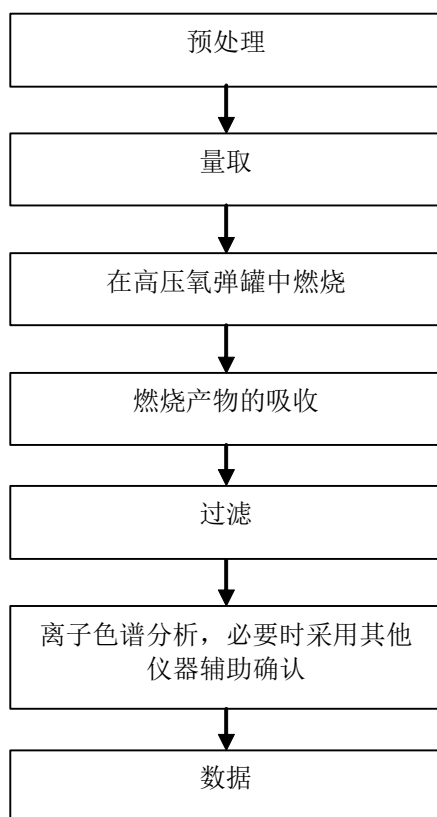
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Halogen(氧弹法)测试流程图

- 1) 分析人员: 徐诚
- 2) 项目负责人: 印宇



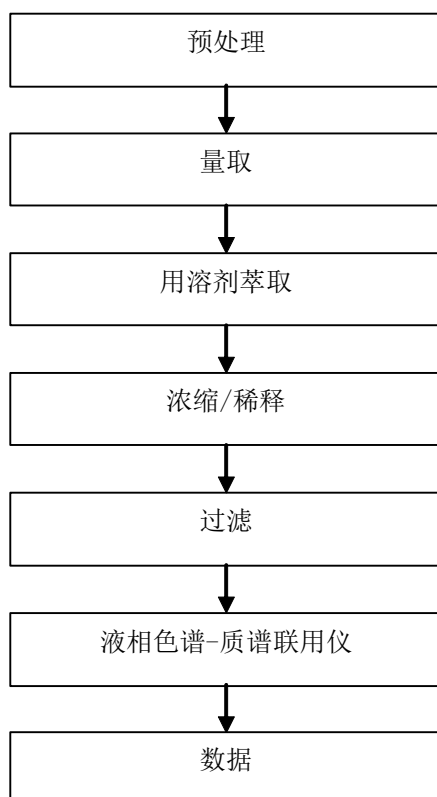
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PFOS/PFOA 测试流程图

- 1) 分析人员: 杨占君
- 2) 项目负责人: 李晓茹



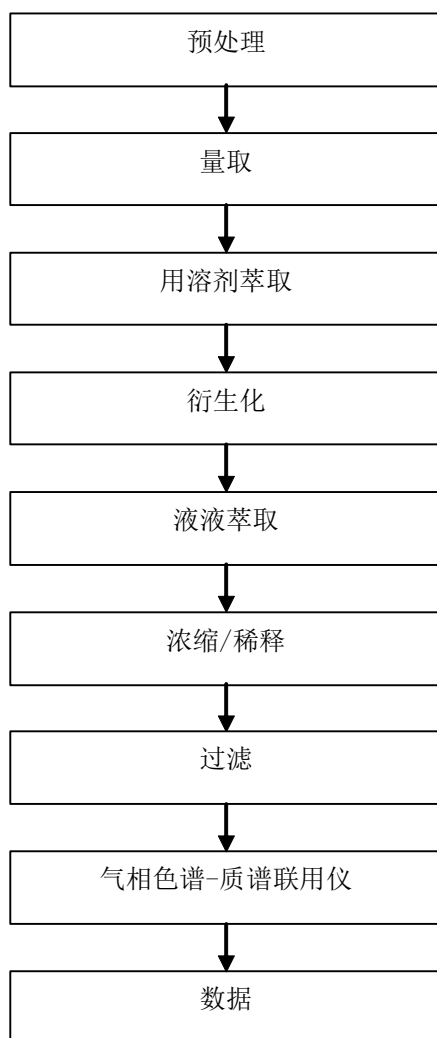
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TBBP-A 测试流程图

- 1) 分析人员: 徐刚
- 2) 项目负责人: 马永存



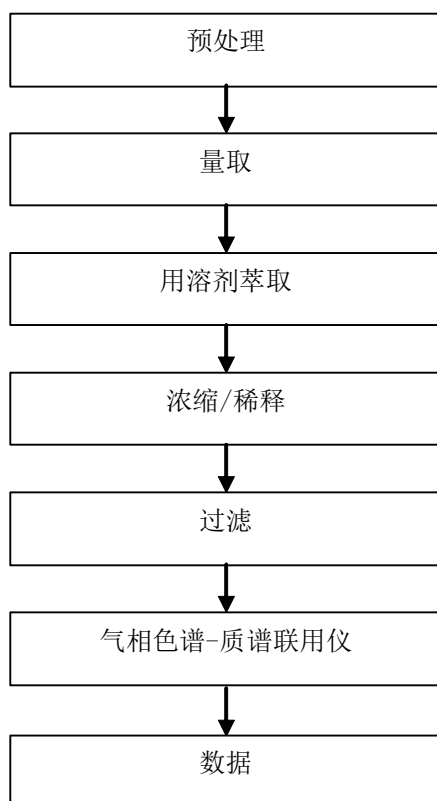
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PAHs 测试流程图

- 1) 分析人员: 高仰景
- 2) 项目负责人: 黄婷



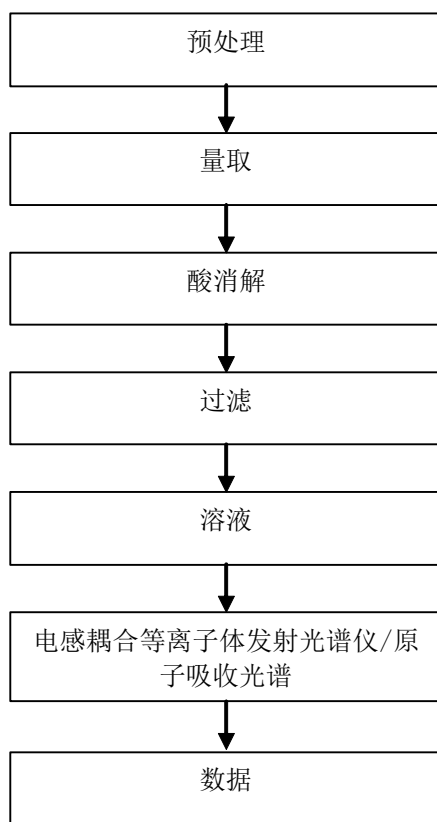
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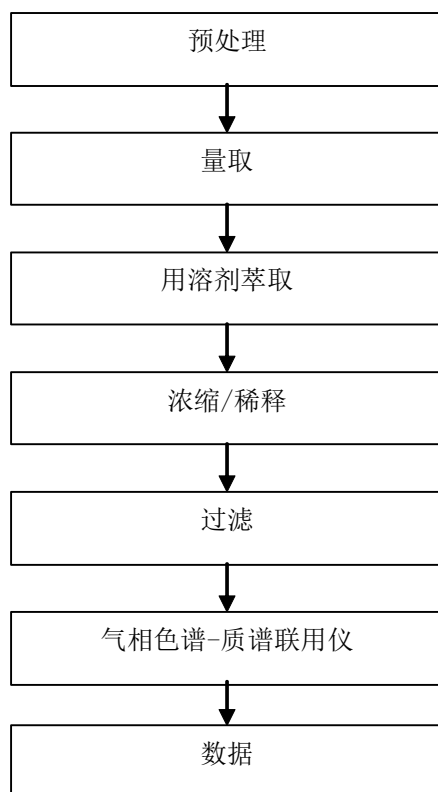
元素测试流程图

- 1) 分析人员: 金叶/ 宋珂静
- 2) 项目负责人: 徐亮/施青



PCB / PCT / PCN 测试流程图

- 1) 分析人员: 张海珍
- 2) 项目负责人: 冯彬彬



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测试报告

No. SHAEC1808924204

日期: 2018年05月11日 第17页,共17页

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