

## 检测报告

编号: CANEC24025150722

日期: 2024 年 11 月 25 日

第 1 页, 共 21 页

客户名称: 建滔(连州)铜箔有限公司  
客户地址: 中国广东省连州市城北区建滔信息产业科技城

样品名称: 电解铜箔  
型号: HTG

以上样品及信息由客户提供。

SGS 工作编号: GZP24-036373  
样品接收时间: 2024 年 11 月 11 日  
检测周期: 2024 年 11 月 11 日 ~ 2024 年 11 月 25 日  
检测要求: 根据客户要求检测  
检测方法: 见后续页。  
检测结果: 见后续页。

检测要求	结论
欧盟 RoHS 指令 2011/65/EU 附录 II 的修正指令(EU) 2015/863-铅、汞、镉、六价铬、多溴联苯 (PBB)、多溴二苯醚 (PBDE)、邻苯二甲酸二(2-乙基己基)酯 (DEHP)、邻苯二甲酸丁苄酯 (BBP)、邻苯二甲酸二丁酯 (DBP)和邻苯二甲酸二异丁酯 (DIBP)	符合
四溴双酚 A (TBBP-A)	见检测结果
中链氯化石蜡(C14-C17) (MCCPs)	见检测结果
美国环保署有毒物质控制法 (TSCA) 第 6 (h)节规定的持久性、生物累积性和毒性 (PBT) 化学物质	符合
全氟辛酸(PFOA)及其盐和全氟辛烷磺酸(PFOS)及其衍生物	见检测结果
卤素	见检测结果
元素分析	见检测结果

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授权签名

叶士龙

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检测要求	结论
红磷	见检测结果
六溴环十二烷(HBCDD)	见检测结果
邻苯二甲酸酯	见检测结果

检测结果:

检测部件外观描述:

样品序号	样品编号	SGS 样品 ID	样品描述
SN1	A2	CAN24-0251507-0001.C002	铜色金属箔

备注:

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

欧盟 RoHS 指令 2011/65/EU 附录 II 的修正指令(EU) 2015/863-铅、汞、镉、六价铬、多溴联苯 (PBB)、多溴二苯醚 (PBDE)、邻苯二甲酸二(2-乙基己基)酯 (DEHP)、邻苯二甲酸丁苄酯 (BBP)、邻苯二甲酸二丁酯 (DBP)和邻苯二甲酸二异丁酯 (DIBP)

检测方法: 参考 IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013, IEC 62321-7-1:2015, IEC 62321-6:2015 和 IEC 62321-8:2017, 采用 ICP-OES/AAS, UV-Vis 和 GC-MS 进行分析。

检测项目	限值	单位	MDL	A2
铅 (Pb)	1000	mg/kg	2	ND
汞 (Hg)	1000	mg/kg	2	ND
镉 (Cd)	100	mg/kg	2	ND
六价铬 (Cr(VI)) ▼	-	µg/cm²	0.10	ND
多溴联苯之和 (PBB)	1000	mg/kg	-	ND
一溴联苯 (MonoBB)	-	mg/kg	5	ND
二溴联苯 (DiBB)	-	mg/kg	5	ND
三溴联苯 (TriBB)	-	mg/kg	5	ND
四溴联苯 (TetraBB)	-	mg/kg	5	ND
五溴联苯 (PentaBB)	-	mg/kg	5	ND
六溴联苯 (HexaBB)	-	mg/kg	5	ND
七溴联苯 (HeptaBB)	-	mg/kg	5	ND
八溴联苯 (OctaBB)	-	mg/kg	5	ND
九溴联苯 (NonaBB)	-	mg/kg	5	ND
十溴联苯 (DecaBB)	-	mg/kg	5	ND
多溴二苯醚之和 (PBDE)	1000	mg/kg	-	ND
一溴二苯醚 (MonoBDE)	-	mg/kg	5	ND
二溴二苯醚 (DiBDE)	-	mg/kg	5	ND



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检测项目	限值	单位	MDL	A2
三溴二苯醚 (TriBDE)	-	mg/kg	5	ND
四溴二苯醚 (TetraBDE)	-	mg/kg	5	ND
五溴二苯醚 (PentaBDE)	-	mg/kg	5	ND
六溴二苯醚 (HexaBDE)	-	mg/kg	5	ND
七溴二苯醚 (HeptaBDE)	-	mg/kg	5	ND
八溴二苯醚 (OctaBDE)	-	mg/kg	5	ND
九溴二苯醚 (NonaBDE)	-	mg/kg	5	ND
十溴二苯醚 (DecaBDE)	-	mg/kg	5	ND
邻苯二甲酸二(2-乙基己基)酯 (DEHP)	1000	mg/kg	50	ND
邻苯二甲酸丁苄酯 (BBP)	1000	mg/kg	50	ND
邻苯二甲酸二丁酯 (DBP)	1000	mg/kg	50	ND
邻苯二甲酸二异丁酯 (DIBP)	1000	mg/kg	50	ND

## 备注:

- (1) 最大允许限值引用自 RoHS 指令 (EU) 2015/863。
- (2) IEC 62321 系列等同于 EN 62321 系列。
- (3) ▼ =
- a. 当六价铬的浓度高于  $0.13 \mu\text{g}/\text{cm}^2$  时, 样品为阳性, 即含有六价铬;
  - b. 当六价铬的浓度为 ND (低于  $0.10 \mu\text{g}/\text{cm}^2$ ) 时, 样品为阴性, 即未检测到六价铬;
  - c. 当六价铬的浓度介于  $0.10 \mu\text{g}/\text{cm}^2$  与  $0.13 \mu\text{g}/\text{cm}^2$  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, 样品的六价铬检测结果仅能代表检测时样品含六价铬的状态。

**四溴双酚 A (TBBP-A)**

检测方法: 参考 US EPA 3550C: 2007, 采用 GC-MS 或 LC-MS 或 LC-MS/MS 进行分析。

检测项目	CAS No.	单位	MDL	A2
四溴双酚 A (TBBP-A)	79-94-7	mg/kg	5	ND

**中链氯化石蜡 (C14-C17) (MCCPs)**

检测方法: 参考 ISO 22818:2021, 采用 GC-NCI-MS 进行分析。

检测项目	CAS No.	单位	MDL	A2
中链氯化石蜡 (C14-C17) (MCCPs)	85535-85-9 和其它	mg/kg	50	ND

**美国环保署有毒物质控制法 (TSCA) 第 6 (h) 节规定的持久性、生物累积性和毒性 (PBT) 化学物质**

检测方法: SGS 内部方法 (SGS-CCL-TOP-149-07, 参考 US EPA 方法 3550C:2007), 采用 GC-MS 进行分析。



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检测项目	CAS No.	限值	单位	MDL	A2
十溴二苯醚 (Deca-BDE) <sup>Δ1</sup>	1163-19-5	禁用	mg/kg	5	ND
异丙基化磷酸三苯酯 (PIP 3:1) <sup>Δ2</sup>	68937-41-7	禁用	mg/kg	5	ND
2,4,6-三叔丁基苯酚 (2,4,6-TTBP) <sup>Δ3</sup>	732-26-3	3000	mg/kg	5	ND
六氯丁二烯 (HCBd)	87-68-3	禁用	mg/kg	5	ND
五氯苯硫酚 (PCTP)	133-49-3	10000	mg/kg	5	ND
结论					符合

## 备注:

(1) 法规信息请参见下链接

<https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/persistent-bioaccumulative-and-toxic-pbt-chemicals-under>(2) <sup>Δ1</sup>: 若送测样品来自于产品或物品含有十溴二苯醚的产品或物品的回收塑料, 则可豁免;(3) <sup>Δ2</sup>: 提交的样品有下列情形之一的, 不在法规的管控范围内:

- 用于航空或军事用途的液压油;
- 润滑剂和润滑脂;
- 汽车和航空航天车辆的新零件和替换零件;
- 生产氰基丙烯酸酯胶粘剂的中间体;
- 机车和船用专用发动机空气滤清器;
- 来自于含有 PIP (3:1) 的产品或物品的回收塑料;
- 用含有 PIP (3:1) 回收产品或物品的塑料制成的产品或物品

(4) <sup>Δ3</sup>: 提交的样品如果不是机油或润滑油, 则不在法规的管控范围内;

## 全氟辛酸(PFOA)及其盐和全氟辛烷磺酸(PFOS)及其衍生物

检测方法: 优化的 EN 17681-1:2022, 采用 LC-MS 或 LC-MS/MS 进行分析。

检测项目	CAS No.	单位	MDL	A2
<b>PFOS 及其盐和相关物质</b>				
全氟辛烷磺酸 (PFOS), 及其盐 <sup>Δ</sup>	1763-23-1	mg/kg	0.010	ND
N-乙基全氟辛烷磺酰胺 (N-EtFOSA)	4151-50-2	mg/kg	0.010	ND
N-甲基全氟辛烷磺酰胺 (N-MeFOSA)	31506-32-8	mg/kg	0.010	ND
2- (N-乙基全氟辛基磺酰胺)乙醇 (N-EtFOSE)	1691-99-2	mg/kg	0.010	ND
2- (N-甲基全氟辛基磺酰胺)乙醇 (N-MeFOSE)	24448-09-7	mg/kg	0.010	ND
全氟辛基磺酰胺 (PFOSA), 及其盐 <sup>Δ</sup>	754-91-6	mg/kg	0.010	ND
N-(全氟-1-辛烷磺酰基)甘氨酸 (FOSAA), 及其盐 <sup>Δ</sup>	2806-24-8	mg/kg	0.010	ND
N-甲基-N-(全氟-1-辛烷磺酰基)甘氨酸 (N-MeFOSAA), 及其盐 <sup>Δ</sup>	2355-31-9	mg/kg	0.010	ND
N-乙基-N-(全氟-1-辛烷磺酰基)甘氨酸 (N-EtFOSAA), 及其盐 <sup>Δ</sup>	2991-50-6	mg/kg	0.010	ND
全氟辛烷磺酸 (PFOS)及其衍生物	-	mg/kg	-	ND
<b>PFOA, 及其盐</b>				
全氟辛酸 (PFOA), 及其盐 <sup>Δ</sup>	335-67-1	mg/kg	0.010	ND

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## 备注:

1. ^物质是指附表中列出的盐/衍生物。

物质名称	CAS No.
<b>PFOS, 及其盐&amp;衍生物</b>	
全氟辛烷磺酸(PFOS)	1763-23-1
全氟辛基磺酸钾(PFOS-K)	2795-39-3
全氟辛基磺酸锂(PFOS-Li)	29457-72-5
全氟辛基磺酸钠(PFOS-Na)	4021-47-0
全氟辛基磺酸铵(PFOS-NH <sub>4</sub> )	29081-56-9
全氟辛基磺酸二乙醇铵(PFOS-NH <sub>2</sub> (C <sub>2</sub> H <sub>4</sub> OH) <sub>2</sub> )	70225-14-8
全氟辛基磺酸四乙基铵(PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> )	56773-42-3
全氟辛基磺酸二癸二甲基铵(PFOS-N(C <sub>10</sub> H <sub>21</sub> ) <sub>2</sub> (CH <sub>3</sub> ) <sub>2</sub> )	251099-16-8
全氟辛基磺酸四丁基铵(PFOS-N(C <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> )	111873-33-7
全氟辛基磺酰氟(PFOS-F)	307-35-7
双[十七氟辛烷磺酸]镁(PFOS-Mg)	91036-71-4
全氟辛烷磺酸吡啶	71463-74-6
全氟辛烷磺酸盐	45298-90-6
全氟辛烷磺酸三乙基铵(PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>3</sub> )	54439-46-2
全氟辛烷磺酸四甲基铵(PFOS-N(CH <sub>3</sub> ) <sub>4</sub> )	56773-44-5
N, N,N-三丙基戊烷-1-七氟辛烷-1-磺酸铵(PFOS-N(C <sub>3</sub> H <sub>7</sub> ) <sub>3</sub> (C <sub>5</sub> H <sub>11</sub> ))	56773-56-9
N,N-二丁基-N-甲基丁烷-1-胺十七氟辛烷-1-磺酸酯(PFOS-N(C <sub>4</sub> H <sub>9</sub> ) <sub>3</sub> (CH <sub>3</sub> ))	124472-68-0
双[4-(1,1-二甲基乙基)苯基]-碘鎓与全氟-1-辛烷磺酸的盐(1:1)	213740-80-8
全氟-1-辛烷磺酸二苯基(2,4,6-三甲基苯基)鎓	258341-99-0
全氟-1-辛烷磺酸 1-十六烷基吡啶鎓	334529-63-4
N,N,N-三乙基癸-1-胺十七氟辛烷-1-磺酸盐	773895-92-4
全氟辛烷磺酸四丁基磷 (PFOS-P (C <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> )	2185049-59-4
全氟辛基磺酸二乙胺 (PFOS-C <sub>4</sub> H <sub>11</sub> N)	2205029-08-7
全氟辛基磺酸庚基二甲基-[2-(2-甲基丙-2-烯酰氧基)乙基]胺 (PFOS-C <sub>15</sub> H <sub>30</sub> NO <sub>2</sub> )	1203998-97-3
全氟辛基磺酸酐(PFOSAN)	423-92-7
<b>FOSAA, 及其盐</b>	
N-(全氟-1-辛烷磺酰基)甘氨酸(FOSAA)	2806-24-8
全氟辛烷磺酰氨基乙酸盐 (FOSAA(anion))	909405-47-6
全氟辛烷磺酰氨基乙酸钾 (FOSAA-K)	75260-69-4
全氟辛烷磺酰氨基乙酸钠 (FOSAA-Na)	115716-87-5
<b>N-MeFOSAA, 及其盐</b>	
N-甲基-N-(全氟-1-辛烷磺酰基)甘氨酸 (N-MeFOSAA)	2355-31-9

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## 检测报告

编号: CANEC24025150722

日期: 2024 年 11 月 25 日

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N-(十七氟辛基磺酰基)-N-甲基甘氨酸盐 (N-Me-FOSAA(anion))	909405-48-7
N-(十七氟辛基磺酰基)-N-甲基甘氨酸钾 (N-Me-FOSAA-K)	70281-93-5
<b>N-EtFOSAA, 及其盐</b>	
N-乙基-N-(全氟-1-辛烷磺酰基)甘氨酸(N-EtFOSAA)	2991-50-6
N-乙基-N-[(十七烷氟辛基)磺酰基]-甘氨酸钾盐 (N-Et-FOSAA-K)	2991-51-7
N-乙基-N-((十七氟辛基)磺酰基)甘氨酸盐 (N-Et-FOSAA(anion))	909405-49-8
N-乙基-N-((十七氟辛基)磺酰基)甘氨酸铵 (N-Et-FOSAA-NH <sub>4</sub> )	2991-52-8
N-乙基-N-((十七氟辛基)磺酰基)甘氨酸钠 (N-Et-FOSAA-Na)	3871-50-9
<b>PFOSA, 及其盐</b>	
全氟辛基磺酰胺(PFOSA)	754-91-6
全氟辛基磺酰胺锂盐(1:1)(PFOSA-Li)	76752-79-9
全氟辛基磺酰胺钠盐 (1:1) (PFOSA-Na)	76752-78-8
全氟辛基磺酰胺钾盐 (1:1) (PFOSA-K)	76752-70-0
全氟辛基磺酰胺铵盐 (1:1) (PFOSA-NH <sub>4</sub> )	76752-72-2
全氟辛基磺酰胺三乙胺 (PFOSA-C <sub>6</sub> H <sub>15</sub> N)	76752-82-4
<b>PFOA, 及其盐&amp;衍生物</b>	
全氟辛酸(PFOA)	335-67-1
全氟辛酸钠(PFOA-Na)	335-95-5
全氟辛酸钾(PFOA-K)	2395-00-8
全氟辛酸银(PFOA-Ag)	335-93-3
全氟辛酰氟(PFOA-F)	335-66-0
全氟辛酸铵(APFO)	3825-26-1
全氟辛酸锂(PFOA-Li)	17125-58-5
全氟辛酸钴(PFOA-Co)	35965-01-6
全氟辛酸铯(PFOA-Cs)	17125-60-9
全氟辛酸铬(3+) (PFOA-Cr(3+))	68141-02-6
全氟辛酸-哌嗪(2:1) (PFOA-NH(C <sub>4</sub> H <sub>10</sub> N))	423-52-9
全氟辛酸盐	45285-51-6
全氟辛酸酐	33496-48-9
全氟辛酸四乙基胺	98241-25-9
全氟辛酸四甲基胺	32609-65-7
全氟辛酸四丙基胺	277749-00-5
全氟辛酸钾水合物 (PFOA-K(H <sub>2</sub> O) <sub>2</sub> )	98065-31-7
全氟辛酸乙胺 (PFOA-C <sub>2</sub> H <sub>5</sub> N)	1376936-03-6
全氟辛酸吡啶 (PFOA-C <sub>5</sub> H <sub>5</sub> N)	95658-47-2
全氟辛酸苯基哌嗪 (PFOA-C <sub>10</sub> H <sub>14</sub> N <sub>2</sub> )	1514-68-7
全氟辛酸辛基三甲基铵 (PFOA-C <sub>11</sub> H <sub>26</sub> N)	927835-01-6

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## 检测报告

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## 卤素

检测方法: 参考 EN 14582:2016, 采用 IC 进行分析。

检测项目	单位	MDL	A2
氟 (F)	mg/kg	20	ND
氯 (Cl)	mg/kg	50	ND
溴 (Br)	mg/kg	50	ND
碘 (I)	mg/kg	50	ND

## 元素分析

检测方法: 参考 US EPA 3050B:1996, 采用 ICP-OES/AAS 进行分析。

检测项目	单位	MDL	A2
砷(As)	mg/kg	10	ND
铍(Be)	mg/kg	5	ND
锑(Sb)	mg/kg	10	ND

## 红磷

检测方法: SGS 内部方法 (SGS-CCL-TOP-215-01), 采用 PY-GC/MS/ ICP-OES / GC-MS 进行分析。

检测项目	CAS No.	单位	MDL	A2
红磷	7723-14-0	mg/kg	500	ND

## 六溴环十二烷(HBCDD)

检测方法: 参考 IEC 62321-9:2021, 采用 GC-MS 进行分析。

检测项目	CAS No.	单位	MDL	A2
六溴环十二烷(HBCDD)及其非对映异构体( $\alpha$ -HBCDD, $\beta$ -HBCDD, $\gamma$ -HBCDD)	134237-50-6 /134237-51-7 /134237-52-8 /25637-99-4 /3194-55-6	mg/kg	20	ND

## 邻苯二甲酸酯

检测方法: 参考 IEC 62321-8:2017, 采用 GC-MS 进行分析。

检测项目	CAS No.	单位	MDL	A2
邻苯二甲酸二丁酯 (DBP)	84-74-2	mg/kg	50	ND
邻苯二甲酸二(2-乙基己基)酯(DEHP)	117-81-7	mg/kg	50	ND
邻苯二甲酸丁苄酯(BBP)	85-68-7	mg/kg	50	ND

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## 检测报告

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检测项目	CAS No.	单位	MDL	A2
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
邻苯二甲酸二异丁酯(DIBP)	84-69-5	mg/kg	50	ND
邻苯二甲酸二正己酯(DnHP)	84-75-3	mg/kg	50	ND
邻苯二甲酸二戊酯 (DPENP/ 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
邻苯二甲酸二丙酯(DPrP)	131-16-8	mg/kg	50	ND
邻苯二甲酸二环己酯(DCHP)	84-61-7	mg/kg	50	ND
邻苯二甲酸二苯甲酯(DBzP)	523-31-9	mg/kg	50	ND
邻苯二甲酸二壬酯(DNP)	84-76-4	mg/kg	50	ND
邻苯二甲酸二异辛酯(DIOP)	27554-26-3	mg/kg	50	ND

除非另有说明, 参照 ILAC-G8:09/2019, 使用简单接受 ( $w=0$ ) 的二元判定规则进行符合性判定。

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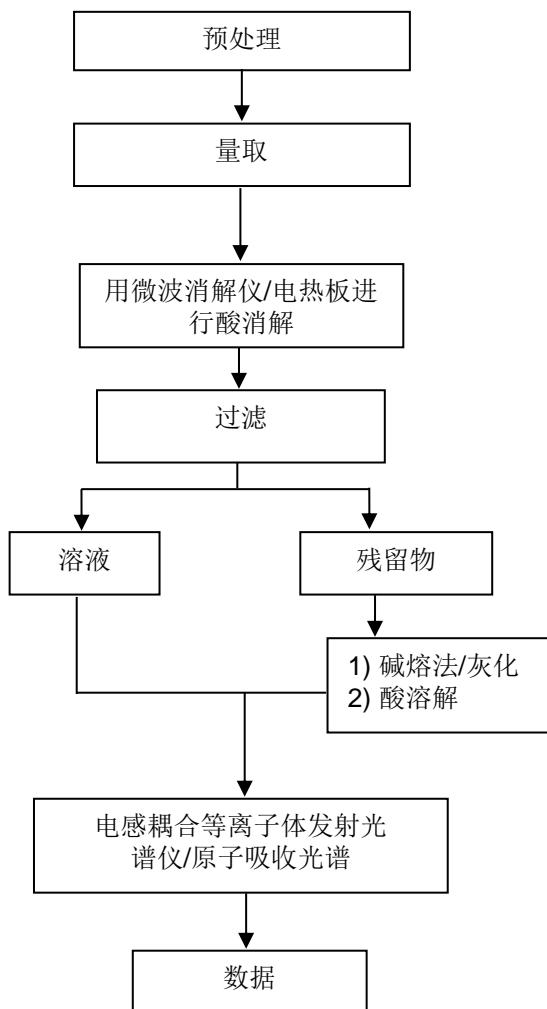
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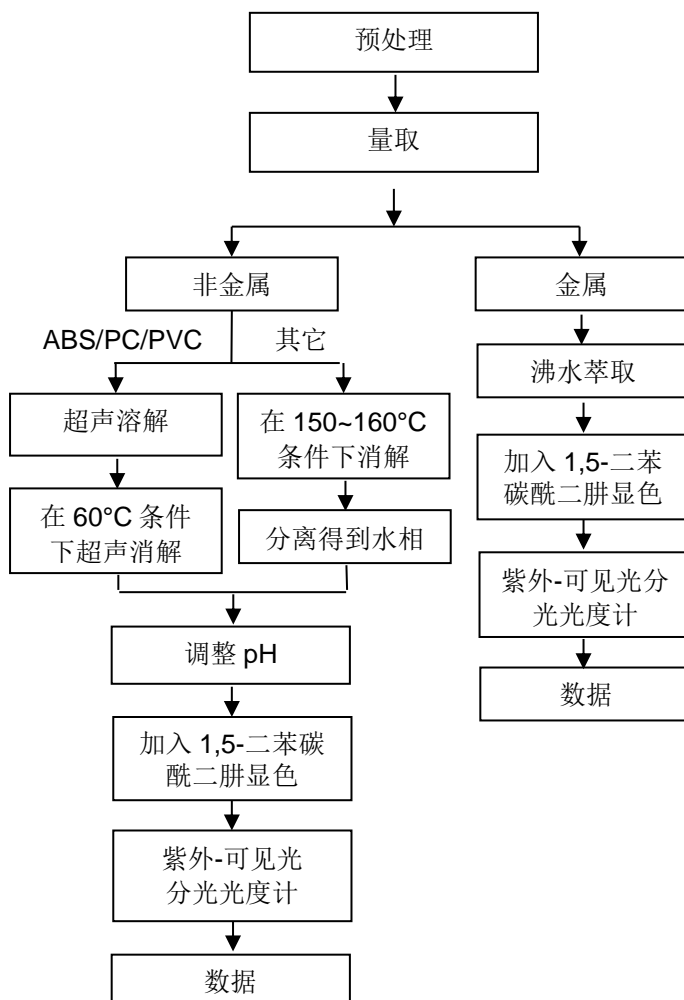


## 元素检测流程图

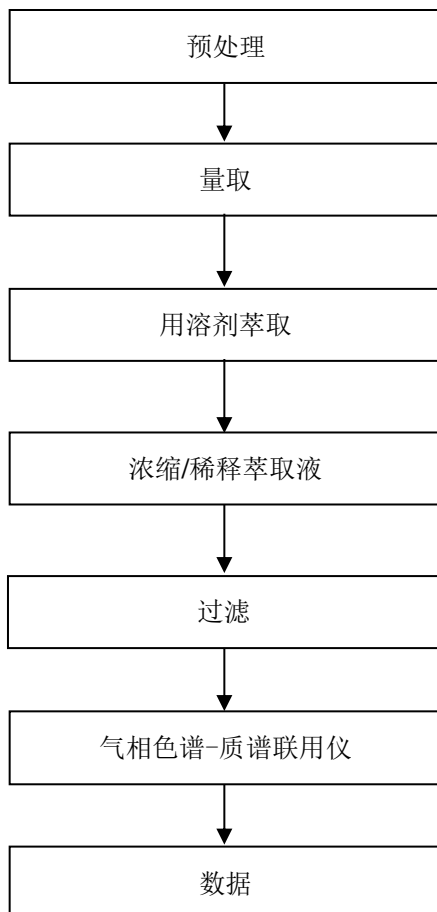
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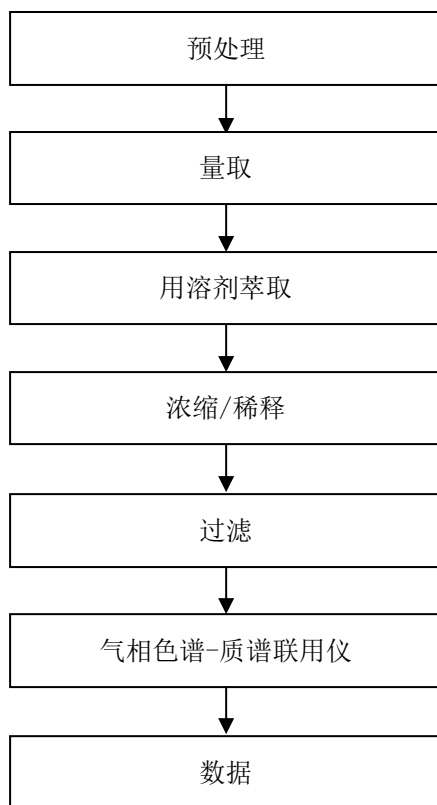
## 六价铬检测流程图



## PBB/PBDE 检测流程图



## Phthalates 检测流程图



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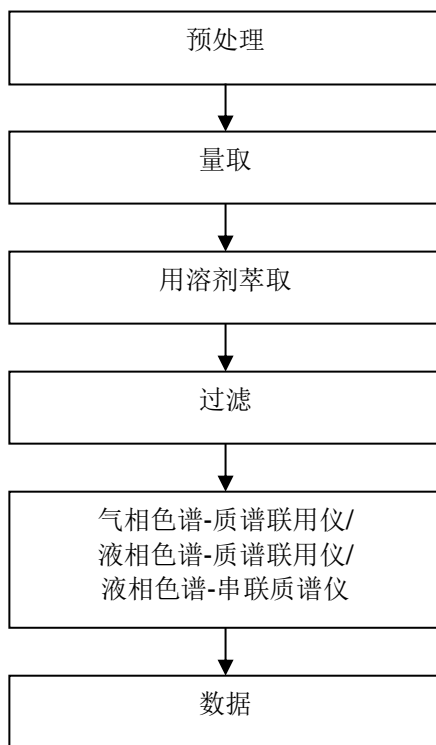
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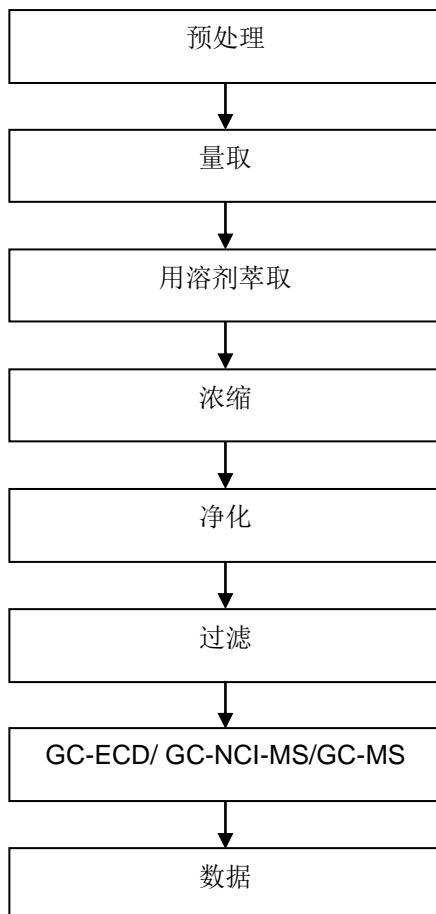
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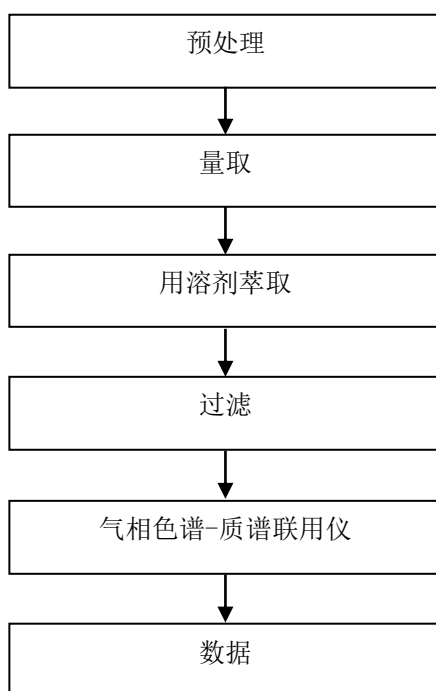
## TBBP-A 检测流程图



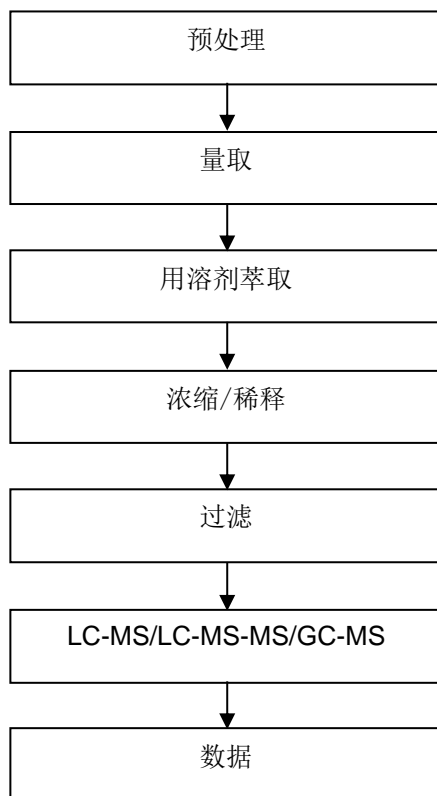
## 氯化石蜡检测流程图



## 持久性、生物累积性和毒性 (PBT) 化学物质检测流程图

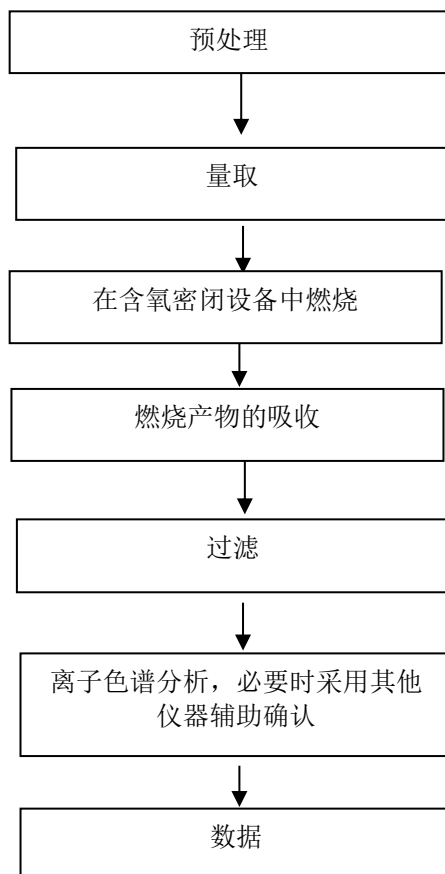


## PFASs/ PFOS/PFOA 检测流程图

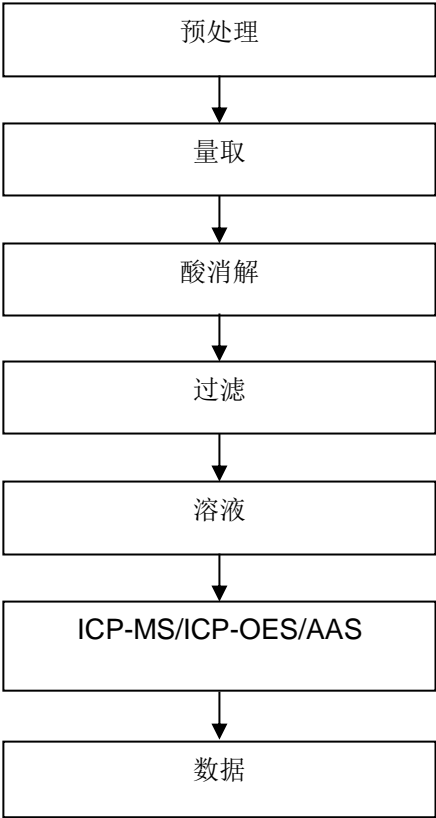




## 卤素检测流程图

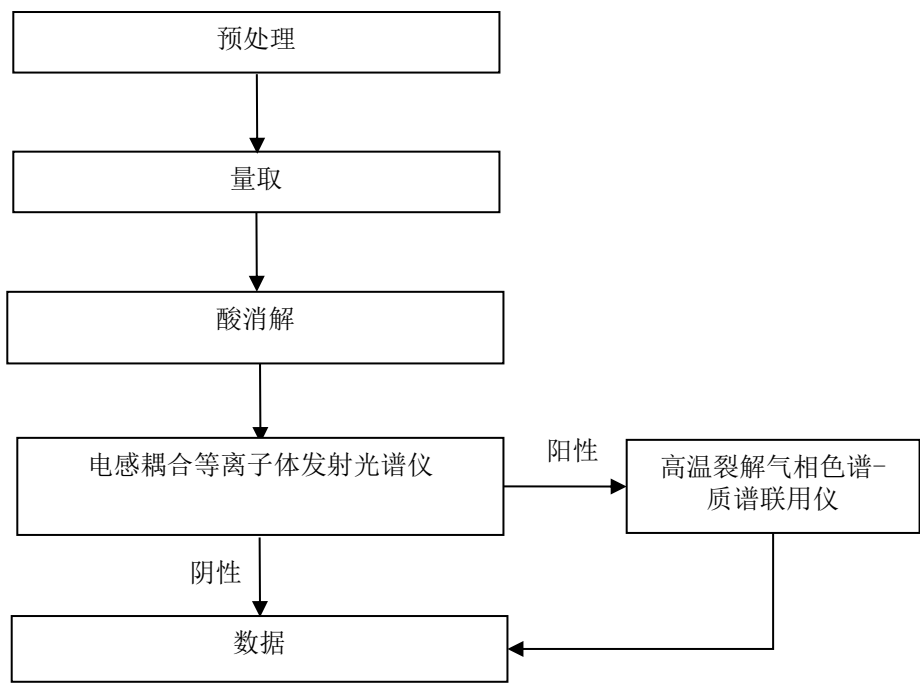


### 元素检测流程图



附件

红磷检测流程图



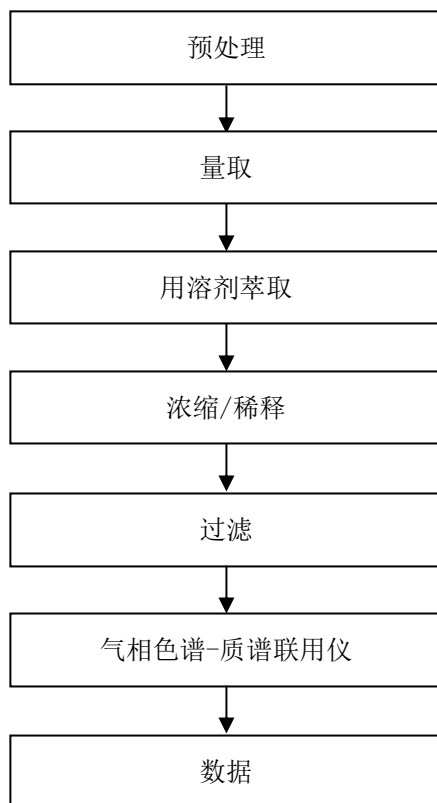
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## HBCDD 检测流程图





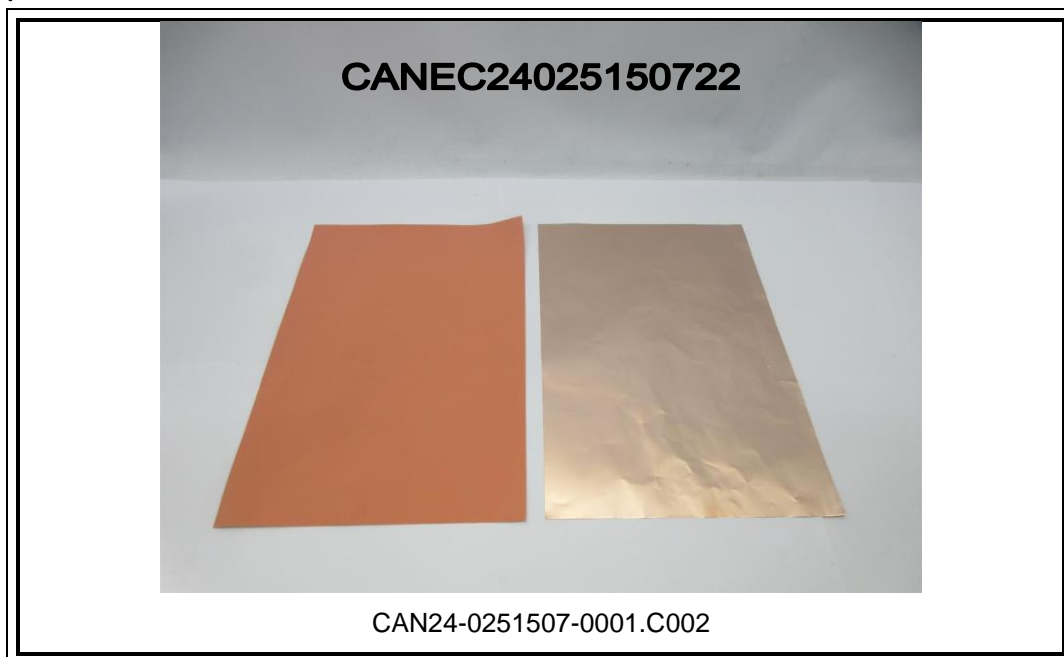
## 检测报告

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