# 測試報告
# Test Report

號碼(No.): EKR24800829　　日期(Date): 28-Aug-2024　　

李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

**以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by the applicant as)：**

| | | |
|---|---|---|
| 送樣廠商(Sample Submitted By) | : | 李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.) |
| 樣品名稱(Sample Name) | : | ELECTRODEPOSITED COPPER FOIL 電解銅箔 |
| 樣品型號(Style/Item No.) | : | PK-HTE-LP3/ PK-HTE-RTF/ BR-HTE-2RT/ BR-DSS-LLX/ BR-DSS-2LX/ BR-HTE-TAX |

==========

| | | |
|---|---|---|
| 收件日(Sample Receiving Date) | : | 19-Aug-2024 |
| 測試期間(Testing Period) | : | 19-Aug-2024 to 28-Aug-2024 |

**測試需求(Test Requested)** : 依據客戶要求進行測試，測試項目請參閱測試結果表格。 (Testing item(s) is/are specified by client. Please refer to result table for testing item(s).)

**測試結果(Test Results)** : 請參閱下一頁 (Please refer to following pages.)

報告簽署人/張伯睿 博士/部經理
Ray Chang, Ph.D./ Department Manager
Signed for and on behalf of
SGS TAIWAN LTD.
化學實驗室-高雄/Chemical Laboratory-Kaohsiung

CHECK REPORT
PIN CODE: 89C9348F

# 測試報告
# Test Report



李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

**測試部位敘述 (Test Part Description)**

No.1 : 銅色銅箔 (COPPER COLORED FOIL)

**測試結果 (Test Results)**

| 測試項目 (Test Items) | 測試方法 (Method) | 單位 (Unit) | MDL | 結果 (Result) |
|---|---|---|---|---|
| | | | | No.1 |
| 六溴環十二烷及所有主要被辨別出的異構物(HBCDD) (α- HBCDD, β- HBCDD, γ- HBCDD) (Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD)) (CAS No.: 25637-99-4, 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8)) | 參考IEC 62321: 2008，以氣相層析儀/質譜儀分析。(With reference to IEC 62321: 2008, analysis was performed by GC/MS.) | mg/kg | 5 | n.d. |
| 中鏈氯化石蠟(C14-C17) (MCCP) (Medium Chain Chlorinated Paraffins(C14-C17) (MCCP)) (CAS No.: 85535-85-9) | 參考US EPA 3550C: 2007，以氣相層析儀/電子補捉偵測器分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/ECD.) | mg/kg | 100 | n.d. |
| 砷 (As) (Arsenic (As)) (CAS No.: 7440-38-2) | 參考US EPA 3052: 1996，以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.) | mg/kg | 2 | n.d. |
| 鉛 (Pb) (Lead (Pb)) (CAS No.: 7439-92-1) | 參考US EPA 3052: 1996，以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.) | mg/kg | 2 | n.d. |
| 鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9) | 參考US EPA 3052: 1996，以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.) | mg/kg | 2 | n.d. |

# 測試報告
# Test Report



李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

| 測試項目 (Test Items) | 測試方法 (Method) | 單位 (Unit) | MDL | 結果 (Result) |
|---|---|---|---|---|
| | | | | No.1 |
| 二甲苯麝香 (Musk xylene) (CAS No.: 81-15-2) | 參考US EPA 3550C: 2007，以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.) | mg/kg | 10 | n.d. |
| 全氟辛酸及其鹽類 (PFOA and its salts) (Perfluorooctanoic acid and its salts (PFOA and its salts)) (CAS No.: 335-67-1 and its salts) | 參考CEN/TS 15968: 2010，以液相層析串聯質譜儀分析。(With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.) | mg/kg | 0.01 | n.d. |
| 雙酚A (Bisphenol A) (CAS No.: 80-05-7) | 參考RSTS-CHEM-239-1，以液相層析串聯質譜儀分析。(With reference to RSTS-CHEM-239-1, analysis was performed by LC/MS/MS.) | mg/kg | 1 | n.d. |
| 五氯酚及其鹽類 (Pentachlorophenol and its salts) (CAS No.: 87-86-5 and its salts) | 參考US EPA 8041A: 2007，以氣相層析儀/質譜儀分析。(With reference to US EPA 8041A: 2007, analysis was performed by GC/MS.) | mg/kg | 1 | n.d. |
| 三氯沙 (Triclosan) (CAS No.: 3380-34-5) | 參考US EPA 3550C: 2007，以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.) | mg/kg | 5 | n.d. |

**備註(Note)：**

1. mg/kg = ppm；0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit (方法偵測極限值)
3. n.d. = Not Detected (未檢出)；小於MDL / Less than MDL

李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

**PFAS Remark：**

現有PFAS定量技術是分析PFAS物質的特定結構，但同碳數族群之PFAS酸及鹽類物質，其可被辨識的特定結構相同，因此無法區別所分析的特定結構是來自酸或者鹽類，故測試結果為同碳數族群之PFAS之酸及鹽類物質的濃度總合。下表PFAS物質濃度皆已包含在測試結果中，相關資訊請參見下表：(下表列舉PFAS物質僅為範例，並不包含所有同碳數族群之PFAS鹽類。)
(The quantitative technology of PFAS is to analyze the specific structure of PFAS substances. However, PFAS acid and its salts with the same carbon number group have the same specific structure that can be identified. The tested results of the analyzed specific structure cannot be distinguished to identify the contribution from PFAS acid or its salts. Therefore, the tested results display the sum of concentrations of PFAS acids and its salts with the same carbon number group. The concentration of PFAS substances in the below table have been included in the tested results, please refer to the table for relevant information: (The listed PFAS substances are examples only, it do not include all PFAS salts with the same carbon number group.))

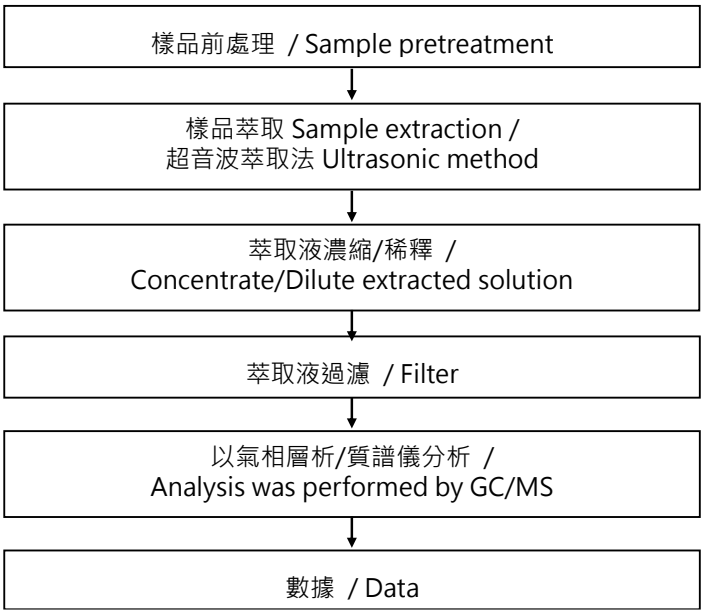
| 群組名稱<br>(Group Name) | 物質名稱<br>(Substance Name) | CAS No. |
|---|---|---|
| PFOA, 及其鹽&衍生物<br>(PFOA, its salts & derivatives) | 全氟辛酸 (Perfluorooctanoic acid) (PFOA) | 335-67-1 |
| | 全氟辛酸鈉 (PFOA-Na)<br>Sodium perfluorooctanoate (PFOA-Na) | 335-95-5 |
| | 全氟辛酸鉀 (PFOA-K)<br>Potassium perfluorooctanoate (PFOA-K) | 2395-00-8 |
| | 全氟辛酸銀 (PFOA-Ag)<br>Silver perfluorooctanote (PFOA-Ag) | 335-93-3 |
| | 全氟辛氟 (PFOA-F)<br>Perfluorooctanoyl fluoride (PFOA-F) | 335-66-0 |
| | 全氟辛酸銨 (APFO)<br>Ammonium pentadecafluorooctanoate (APFO) | 3825-26-1 |
| | 全氟辛酸鋰 (PFOA-Li)<br>Lithium perfluorooctanoate (PFOA-Li) | 17125-58-5 |
| | 全氟辛酸鈷 (PFOA-Co)<br>Cobalt perfluorooctanoate (PFOA-Co) | 35965-01-6 |
| | 全氟辛酸銫 (PFOA-Cs)<br>Cesium perfluorooctanoate (PFOA-Cs) | 17125-60-9 |
| | 全氟辛酸鉻 (PFOA-Cr($3^+$))<br>Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, chromium(3+) (PFOA-Cr($3^+$)) | 68141-02-6 |
| | 全氟辛酸-哌嗪(2:1) PFOA-NH($C_4H_{10}N$)<br>Pentadecafluorooctanoic acid--piperazine (2/1)PFOA-NH($C_4H_{10}N$) | 423-52-9 |

李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

| 群組名稱 (Group Name) | 物質名稱 (Substance Name) | CAS No. |
|---|---|---|
| PFOA, 及其鹽&衍生物 (PFOA, its salts & derivatives) | 全氟辛酸鹽<br>Pentadecafluorooctanoate (anion) | 45285-51-6 |
| | 全氟辛酸酐<br>Perfluorooctanoic Anhydride | 33496-48-9 |
| | 乙銨，N,N,N-三乙基-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十五氟辛酸 (1:1)<br>Ethanaminium, N,N,N-triethyl-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctanoate (1:1) | 98241-25-9 |
| | 全氟辛酸四甲銨鹽<br>Tetramethylammoniumperfluoroctanoat | 32609-65-7 |
| | 1-丙銨，N,N,N-三丙基-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十五氟辛酸(1:1)<br>1-Propanaminium, N,N,N-tripropyl-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctanoate (1:1) | 277749-00-5 |
| | 辛酸，2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十五氟-鉀鹽，水合物 (1:1:2) (PFOA-$K(H_2O)_2$)<br>Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, potassium salt, hydrate (1:1:2) (PFOA-$K(H_2O)_2$) | 98065-31-7 |
| | 辛酸，2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十五氟-，化合物。與乙胺 (1:1) (PFOA-$C_2H_7N$)<br>Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, compd. with ethanamine (1:1) (PFOA-$C_2H_7N$) | 1376936-03-6 |
| | 十五氟辛酸化合物與吡啶 (1:1) (9CI) (PFOA-$C_5H_5N$)<br>Octanoic acid, pentadecafluoro-, compd. with pyridine (1:1) (9CI) (PFOA-$C_5H_5N$) | 95658-47-2 |
| | 十五氟辛酸-1-苯基哌嗪(1:1) (PFOA-$C_{10}H_{14}N_2$)<br>Pentadecafluorooctanoic acid- 1-phenylpiperazine(1:1) (PFOA-$C_{10}H_{14}N_2$) | 1514-68-7 |
| | 1-辛胺，N,N,N-三甲基-，2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十五氟辛酸(1:1) (PFOA- $C_{11}H_{26}N$)<br>1-Octanaminium, N,N,N-trimethyl-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctanoate (1:1) (PFOA- $C_{11}H_{26}N$) | 927835-01-6 |

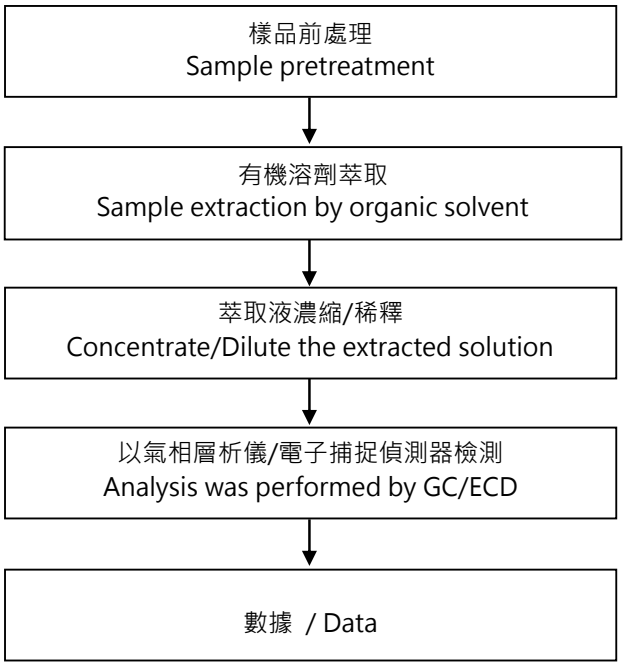
李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

**六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD**



李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

**氯化石蠟分析流程圖 / Analytical flow chart - Chlorinated Paraffins**



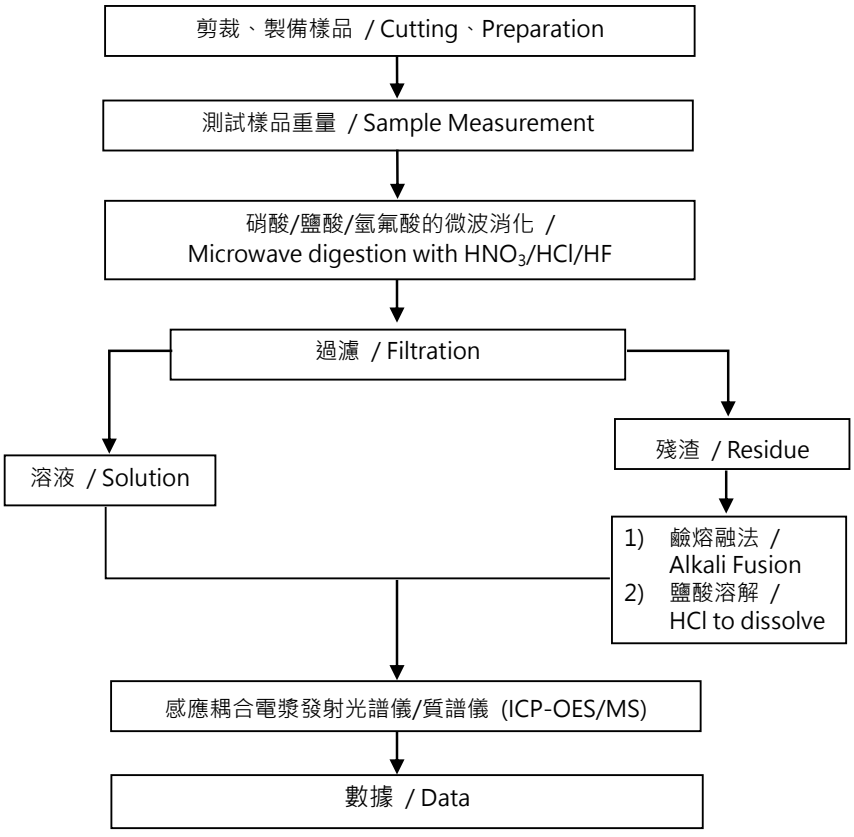
李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

**元素(含重金屬)分析流程圖 / Analytical flow chart of Elements (Heavy metal included)**

根據以下的流程圖之條件，樣品已完全溶解。

These samples were dissolved totally by pre-conditioning method according to below flow chart.

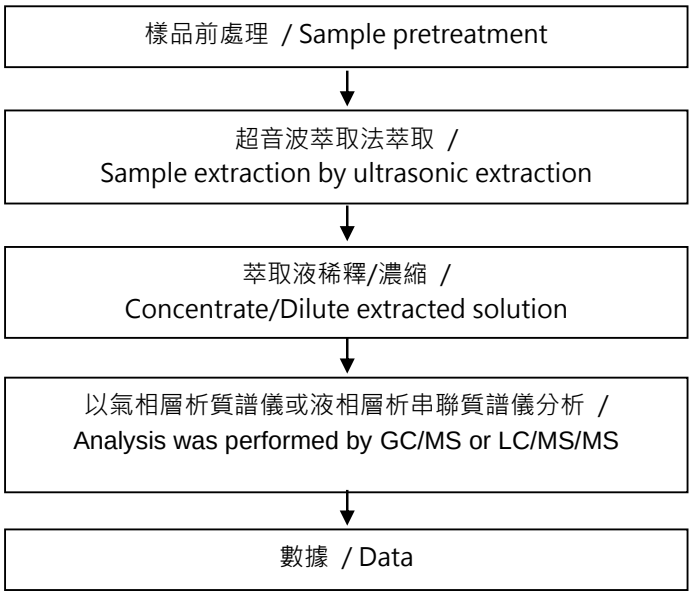
【參考方法/Reference method：US EPA 3051、US EPA 3052】




* US EPA 3051 方法未添加氫氟酸 / US EPA 3051 method does not add HF.

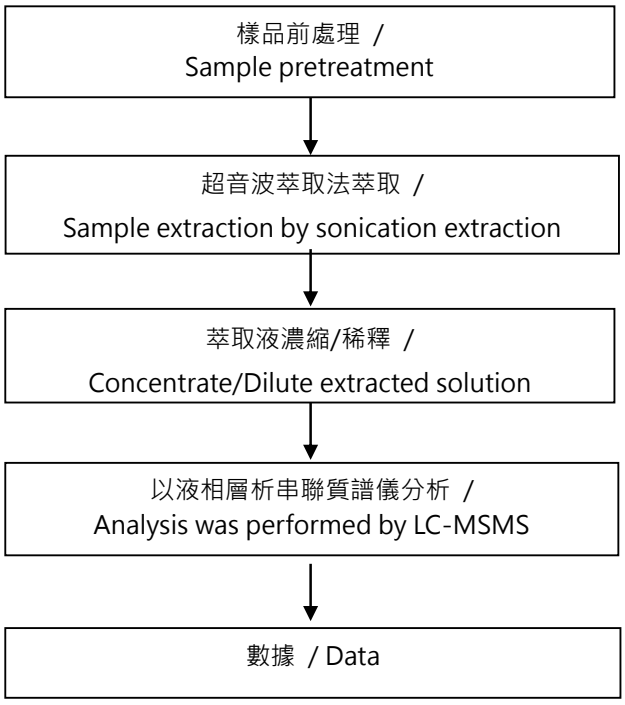
李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

**全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)**



李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

**雙酚A分析流程圖 / Bisphenol A analytical flow chart**



# 測試報告
# Test Report



李長榮科技股份有限公司 (LCY TECHNOLOGY CORP.)
臺北市松山區八德路4段83號5樓 (5F., NO.83, SEC.4 BADE RD., SONGSHAN DIST., TAIPEI CITY 105, TAIWAN (R.O.C.))

*** 照片中如有箭頭標示，則表示為實際檢測之樣品/部位. ***
**(The tested sample / part is marked by an arrow if it's shown on the photo.)**

## EKR24800829

** 報告結尾 (End of Report) **