



# TEST REPORT

Lab No. : (6224)236-0058  
Date : August 29, 2024  
Page : 1 of 12

## APPLICANT

申請人

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## DATE OF SUBMISSION

送樣日期

August 23, 2024  
: 2024 年 08 月 23 日

## PERFORMANCE PERIOD

測試日期

August 23, 2024 to August 29, 2024  
: 2024 年 08 月 23 日至 2024 年 08 月 29 日

## SAMPLE DESCRIPTION

樣品描述

: TVS/Zener WAFER

## ITEM NO.

產品型號

: TVS/Zener All SERIAL

### SUMMARY OF TEST RESULTS 測試結果摘要

TEST REQUESTED 測試要求	CONCLUSION 結論	REMARK 備註
Heavy Metals and Flame Retardants Content – European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) 重金屬和阻燃劑含量 – 有關歐盟委員會針對電子產品的指令 (電子電氣禁用某些有害物質指令), 2011/65/EU	PASS 通過	—
Phthalates Test – Directive (EU)2015/863 Amendment of European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) 鄰苯二甲酸鹽測試 – 指令2011/65/EU 歐洲議會和理事會關於電子電氣設備中限制使用某些有害物質 (RoHS)的修正案指令 (EU)2015/863.	PASS 通過	—
Phthalates Content 鄰苯二甲酸鹽含量	DATA 數據	Test result in page 4 測試結果請見第 4 頁
Hexabromocyclododecane (HBCDD) 六溴環十二烷	DATA 數據	Test result in page 5 測試結果請見第 5 頁
Halogen Content - Fluorine, Chlorine, Bromine and Iodine 鹵素含量 – 氟、氯、溴和碘	DATA 數據	Test result in page 5 測試結果請見第 5 頁
Total Beryllium (Be) Content 總鈹含量	DATA 數據	Test result in page 5 測試結果請見第 5 頁
Total Antimony (Sb) Content 總銻含量	DATA 數據	Test result in page 6 測試結果請見第 6 頁

C/N /TC/JK

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Lab No. : (6224)236-0058  
Date : August 29, 2024  
Page : 2 of 12

**REMARK 備註**

If there are questions or concerns on this report, please contact:  
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Lab No. : (6224)236-0058  
Date : August 29, 2024  
Page : 3 of 12

**TEST RESULT 測試結果**

Tested item 測試部件	
1.	Silver/ black/ white wafer / 銀色/ 黑色/ 白色晶圓

**Heavy Metals and Flame Retardants Content – European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)**

**重金屬和阻燃劑含量 – 有關歐盟委員會針對電子產品的指令(電子電氣禁用某些有害物質指令), 2011/65/EU**

Compounds 化合物	Unit 單位	Tested item 測試部件	RoHS' Limits 限用有害物質指令 限值
		1	
Lead [Pb] / 鉛	mg/kg	N.D.	1000
Cadmium [Cd] / 鎘	mg/kg	N.D.	100
Mercury [Hg] / 汞	mg/kg	N.D.	1000
Chromium (VI) [Cr(VI)] / 六價鉻	mg/kg	N.D.	1000
<b>Polybrominated Biphenyls[PBBs] / 多溴聯苯</b>			
Bromobiphenyls / 一溴聯苯	mg/kg	N.D.	
Dibromobiphenyls / 二溴聯苯	mg/kg	N.D.	
Tribromobiphenyls / 三溴聯苯	mg/kg	N.D.	
Tetrabromobiphenyls / 四溴聯苯	mg/kg	N.D.	
Pentabromobiphenyls / 五溴聯苯	mg/kg	N.D.	
Hexabromobiphenyls / 六溴聯苯	mg/kg	N.D.	
Heptabromobiphenyls / 七溴聯苯	mg/kg	N.D.	
Octabromobiphenyls / 八溴聯苯	mg/kg	N.D.	
Nonabromobiphenyls / 九溴聯苯	mg/kg	N.D.	
Decabromobiphenyl / 十溴聯苯	mg/kg	N.D.	
Sum of PBBs / 多溴聯苯總和	mg/kg	N.D.	
<b>Polybrominated Diphenyl Ethers[PBDEs] / 多溴聯苯醚</b>			
Bromodiphenyl ethers / 一溴聯苯醚	mg/kg	N.D.	
Dibromodiphenyl ethers / 二溴聯苯醚	mg/kg	N.D.	
Tribromodiphenyl ethers / 三溴聯苯醚	mg/kg	N.D.	
Tetrabromodiphenyl ethers / 四溴聯苯醚	mg/kg	N.D.	
Pentabromodiphenyl ethers / 五溴聯苯醚	mg/kg	N.D.	
Hexabromodiphenyl ethers / 六溴聯苯醚	mg/kg	N.D.	
Heptabromodiphenyl ethers / 七溴聯苯醚	mg/kg	N.D.	
Octabromodiphenyl ethers / 八溴聯苯醚	mg/kg	N.D.	
Nonabromodiphenyl ethers / 九溴聯苯醚	mg/kg	N.D.	
Decabromodiphenyl ether / 十溴聯苯醚	mg/kg	N.D.	
Sum of PBDEs / 多溴聯苯醚總和	mg/kg	N.D.	
Conclusion 結論	—	PASS 通過	—



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Lab No. : (6224)236-0058  
Date : August 29, 2024  
Page : 4 of 12

**TEST RESULT 測試結果**

**Phthalates Test – Directive (EU)2015/863 Amendment of European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)**

**鄰苯二甲酸鹽測試 – 指令2011/65/EU 歐洲議會和理事會關於電子電氣設備中限制使用某些有害物質 (RoHS) 的修正案指令(EU)2015/863.**

Test Parameter 測試項目	CAS No. CAS 編號	Unit 單位	Tested item 測試部件	Maximum Allowable Limit 最大允許限值
			1	
Dibutyl phthalate (DBP) 鄰苯二甲酸二丁酯	84-74-2	%	N.D.	0.1
Butyl benzyl phthalate (BBP) 鄰苯二甲酸丁苄酯	85-68-7	%	N.D.	0.1
Bis(2-ethylhexyl) phthalate (DEHP) 鄰苯二甲酸二異辛酯	117-81-7	%	N.D.	0.1
Diisobutyl phthalate (DIBP) 鄰苯二甲酸二異丁酯	84-69-5	%	N.D.	0.1
Conclusion 結論	—	—	PASS 通過	—

**Phthalates Content**

**鄰苯二甲酸鹽含量**

Test Parameter 測試項目	CAS No. CAS 編號	Unit 單位	Tested item 測試部件
			1
Di-n-octyl phthalate (DNOP) 鄰苯二甲酸二正辛酯 (DNOP)	117-84-0	%	N.D.
Di-isodecyl phthalate (DIDP) 鄰苯二甲酸二異癸酯 (DIDP)	26761-40-0	%	N.D.
Di-isononyl phthalate (DINP) 鄰苯二甲酸二異壬酯 (DINP)	28553-12-0	%	N.D.
Di-n-pentyl Phthalate (DNPP) 鄰苯二甲酸二戊酯 (DNPP)	131-18-0	%	N.D.
Di-n-hexyl phthalate (DNHP/DHEXP) 鄰苯二甲酸二己酯 (DNHP/DHEXP)	84-75-3	%	N.D.
Dimethoxyethyl phthalate (DMEP) 鄰苯二甲酸二甲氧基乙酯 (DMEP)	117-82-8	%	N.D.
Diisopentylphthalate (DiPP) 鄰苯二甲酸二異戊酯 (DiPP)	605-50-5	%	N.D.
N-pentyl-isopentylphthalate (NPIPP) 鄰苯二甲酸正戊基異戊基酯 (NPIPP)	776297-69-9	%	N.D.

**TEST RESULT 測試結果**

**Hexabromocyclododecane (HBCDD)**

六溴環十二烷

Test Parameter 測試項目	Unit 單位	Tested item 測試部件
		1
Hexabromocyclododecane (HBCDD) 六溴環十二烷	mg/kg	N.D.

**Halogen Content - Fluorine, Chlorine, Bromine and Iodine**

鹵素含量 - 氟、氯、溴和碘

Compounds 化合物	Unit 單位	Tested item 測試部件
		1
Halogenated Compounds / 鹵素:		
Fluorine [F] / 氟	mg/kg	N.D.
Chlorine [Cl] / 氯	mg/kg	N.D.
Bromine [Br] / 溴	mg/kg	N.D.
Iodine [I] / 碘	mg/kg	N.D.
Sum of Halogenated Compounds / 鹵素總和	mg/kg	N.D.

**Total Beryllium (Be) Content**

總鉍含量

Test Parameter 測試項目	Unit 單位	Tested Item 測試部件
		1
Total Beryllium (Be) Content 總鉍含量	mg/kg	N.D.

**TEST RESULT 測試結果**

**Total Antimony (Sb) Content**

**總銻含量**

Test Parameter 測試項目	Unit 單位	Tested Item 測試部件
		1
Total Antimony (Sb) Content 總銻含量	mg/kg	N.D.

**Note 註解:**

N.D. = Not Detected (低於報告限值)    – = Empty (空白)

mg/kg = milligram per kilogram = ppm (毫克/公斤, 百萬分之一)

% = percent (百分率)

10 000 mg/kg = 1 %

Reporting Limit / 報告限值:

Pb, Cd, Hg: 2 mg/kg

Cr(VI): 8 mg/kg

PBBs & PBDEs: Each 5 mg/kg

Phthalate Content: Each 0.005%

HBCDD: 5 mg/kg

F, I: 50 mg/kg

Cl, Br: 50 mg/kg

Tota Be: 10 mg/kg

Total Sb: 10 mg/kg

Test Parameter 測試項目	Test Method 測試方法
Lead [Pb] / 鉛	With reference to IEC 62321-5: 2013. 參照 IEC 62321-5: 2013.
Cadmium [Cd] / 鎘	
Mercury [Hg] / 汞	With reference to IEC 62321-4: 2013+AMD 1:2017 CSV. 參照 IEC 62321-4: 2013+AMD 1:2017 合併版本。
Chromium (VI) [Cr(VI)] / 六價鉻	Polymers & Electronics 聚合物及電子: With reference to IEC 62321-7-2:2017. 參照 IEC 62321-7-2:2017。
Polybrominated Biphenyls[PBBs] and Polybrominated Diphenyl Ethers [PBDEs] / 多溴聯苯和多溴聯苯醚	With reference to IEC 62321-6: 2015. 參照 IEC 62321-6: 2015。



**BUREAU  
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Lab No. : (6224)236-0058  
Date : August 29, 2024  
Page : 7 of 12

Test Parameter 測試項目	Test Method 測試方法
Phthalates Content / 鄰苯二甲酸鹽含量	With reference to IEC 62321-8: 2017. 參照 IEC 62321-8: 2017。
Hexabromocyclododecane (HBCDD) / 六溴環十二烷:	With reference to IEC 62321-9 extracted with organic solvent and then analysed by Liquid Chromatograph Mass Spectrometer. 參照 IEC 62321-9 以有機溶劑萃取，液相層析質譜儀分析 (LC-MS)
Halogenated Compounds: F, Cl, Br, I / 鹵素: 氟, 氯, 溴和碘	With reference to EN14582:2016(E). 參照 EN14582:2016(E)。
Total Beryllium (Be) Content 總鈹含量	With reference to U.S. EPA 3050B and analysed by ICP-OES. 參照 U.S. EPA 3050B，並且已感應耦合電漿原子發射光譜儀譜分析。
Total Antimony (Sb) Content 總銻含量	With reference to U.S. EPA 3050B and analysed by ICP-OES. 參照 U.S. EPA 3050B，並且已感應耦合電漿原子發射光譜儀譜分析。

**Remark 備註:**

1. The result only relates to the tested item. The report shall not be reproduced except full without the written approval of the testing laboratory. Parameters which are not covered by the lab's testing scope are subcontracted to laboratories with government approval. The accreditation relates to competences given in the accreditation certificate.  
測試結果僅代表經測試部件。本報告未經測試實驗室認可不得複製。未在本實驗室測試範疇之測試均委外至經官方核可之實驗室。委外實驗室之能力經認證許可。
2. Samples test were conducted as per applicant's request.  
樣品測試進行為依照申請人的要求。

- End 結束 -

**Photo of the Submitted Sample**  
委送樣品照片

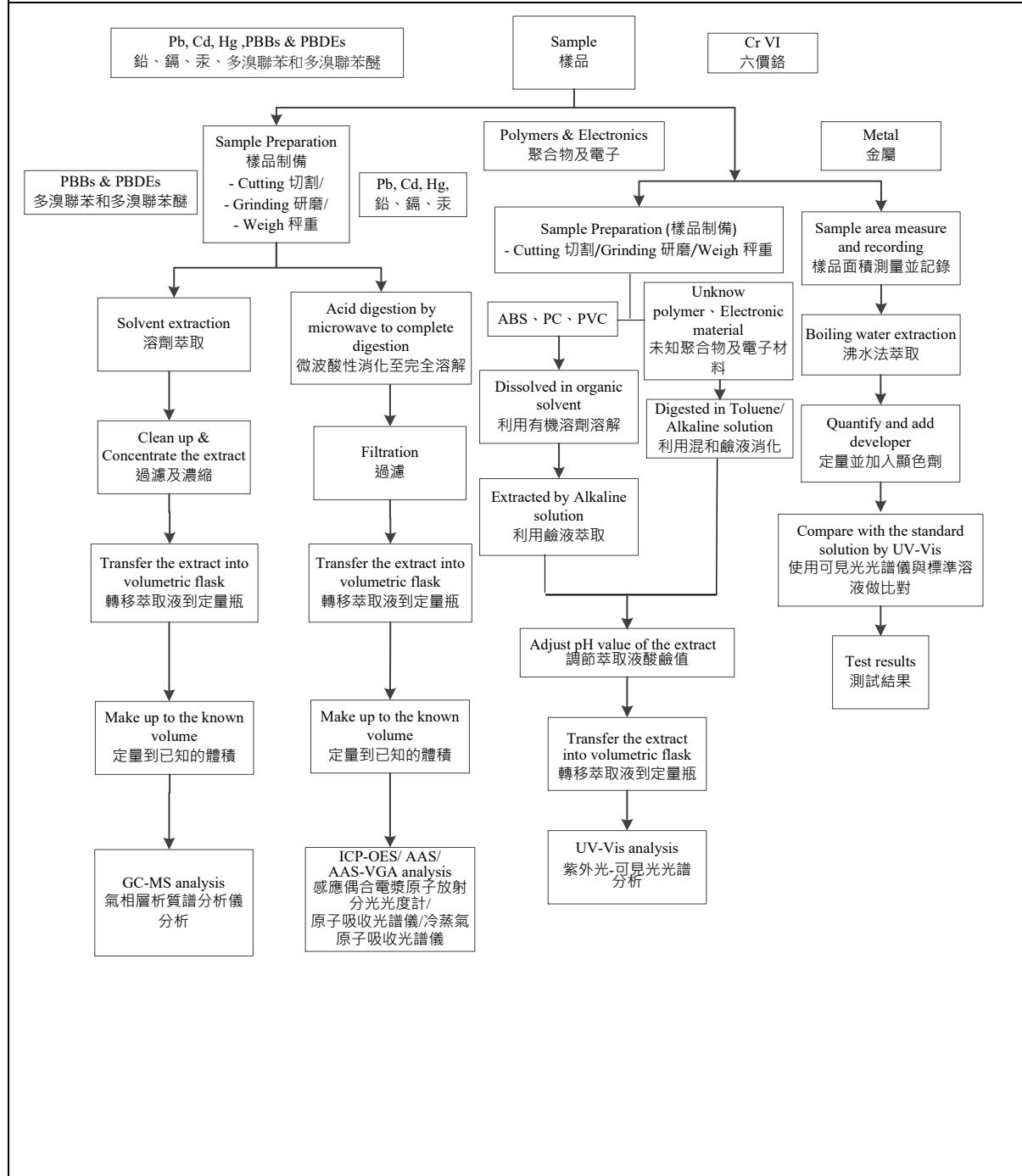


Sample



## APPENDIX(附錄)

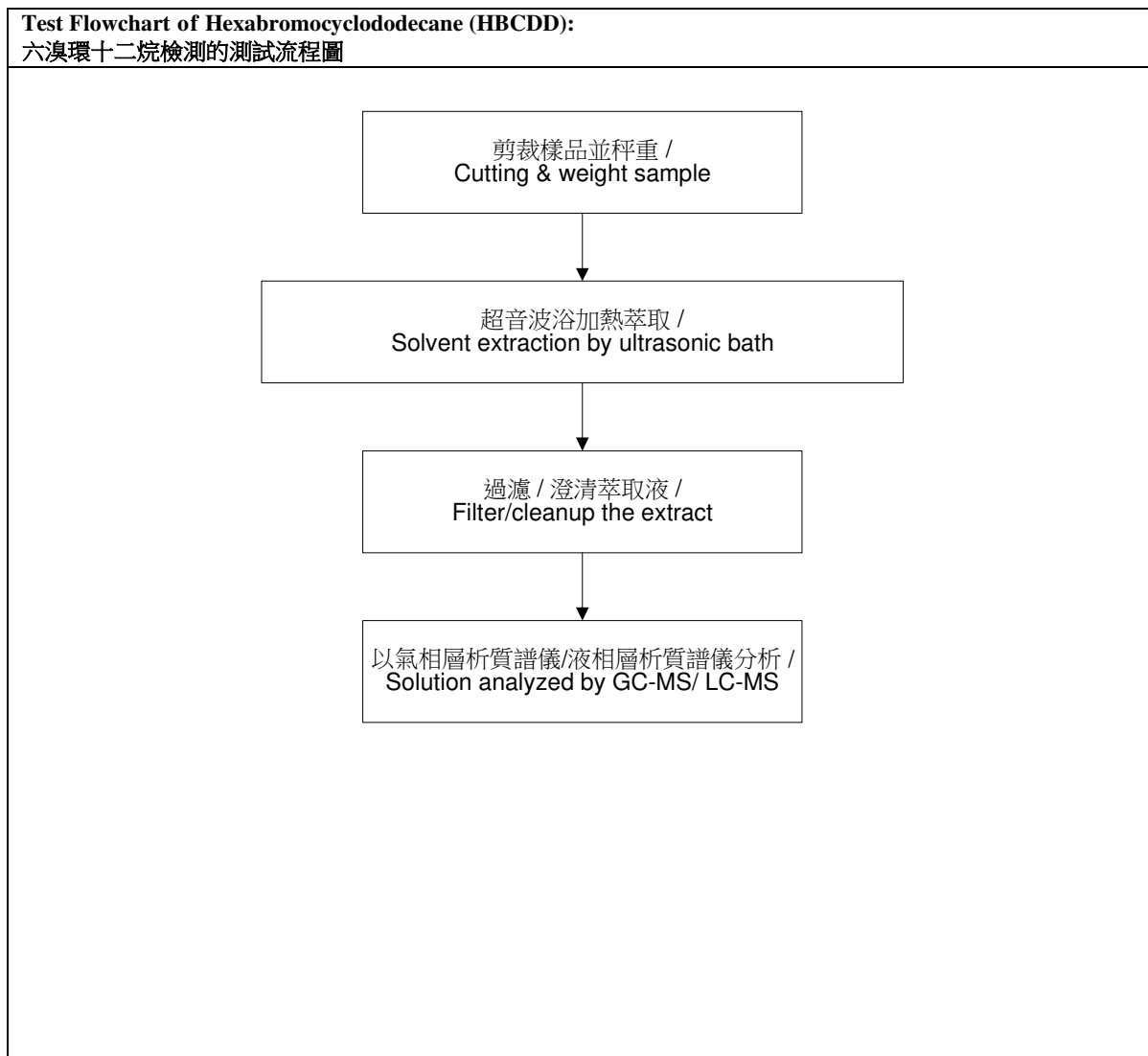
**Test Flowchart of Heavy Metals and Flame Retardants Content [ European Council Directive 2011/65/EU ]:**  
**重金屬和阻燃劑的測試流程圖 [ 歐盟委員會指令 2011/65/EU ]:**



## APPENDIX(附錄)

### Test Flowchart of Hexabromocyclododecane (HBCDD):

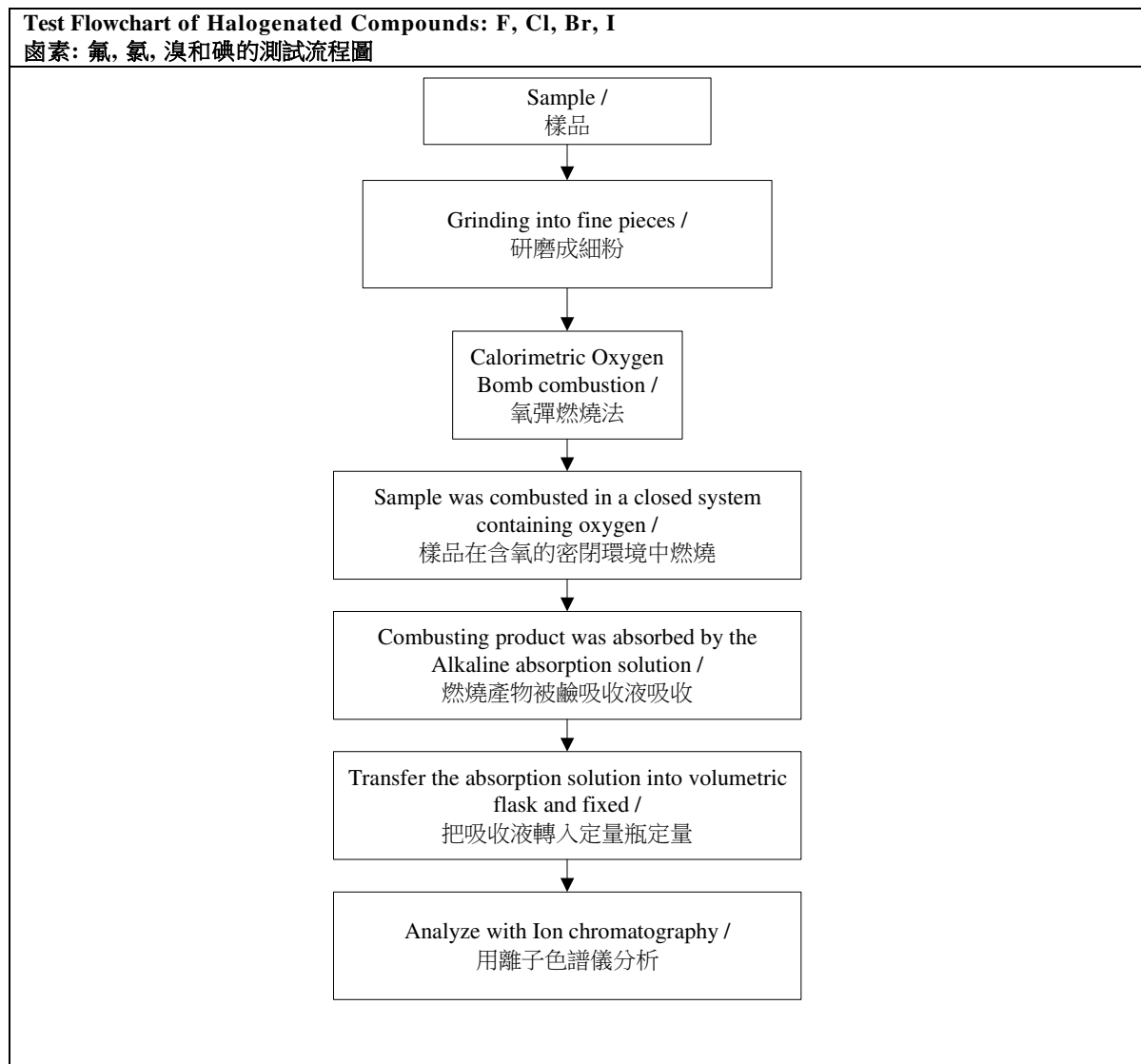
六溴環十二烷檢測的測試流程圖



## APPENDIX(附錄)

### Test Flowchart of Halogenated Compounds: F, Cl, Br, I

鹵素: 氟, 氯, 溴和碘的測試流程圖



### APPENDIX(附錄)

**Test Flowchart of Total Beryllium (Be) Content and Total Antimony (Sb) Content:**  
鉍含量與總銻含量的測試流程圖:

