TAIWAN TECH
National Taiwan University of Science and Technology

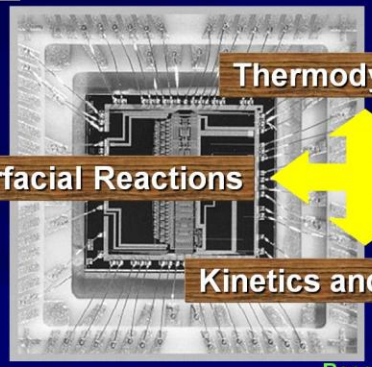
國立臺灣科技大學
National Taiwan University of Science and Technology

電子構裝與綠色材料實驗室簡介

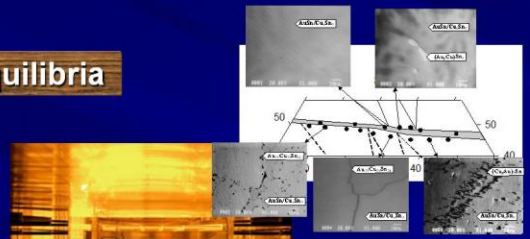
指導負責人：顏怡文老師

Department of Materials Science and Engineering
National Taiwan University of Science and Technology

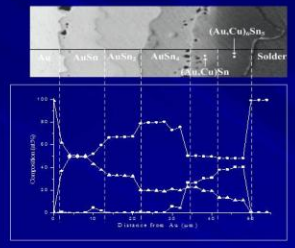
Electronic Packaging & Green Materials Laboratory



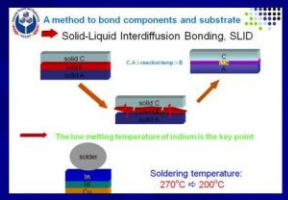
Phase Equilibria



Interfacial Reactions



SLID



Research Interests

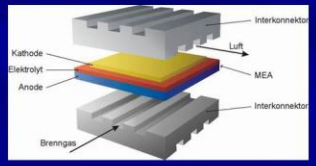
1. Phase equilibria and interfacial reactions between lead-free solders and substrates
2. Thermodynamics and kinetic to a variety of materials
3. SOFC (Solid oxide fuel cell)
4. Thin film deposition
5. Nanotechnology
6. CALPHAD (Calculation of phase diagram)
7. Bulk Metallic Glass
8. 3D IC Packaging

Advisor: Professor Yen Yee-Wen

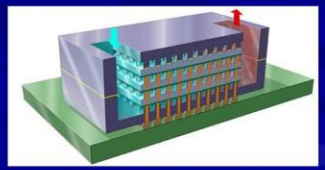
NTHU	Chemical Engineering	1997.09~2002.09
NTHU	Chemical Engineering	1995.09~1997.06
NTHU	Chemical Engineering	1991.10~1995.06

請放實驗室
生活照一張！

SOFC



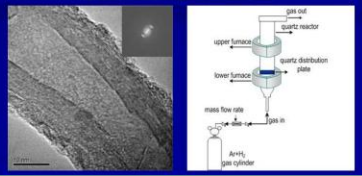
3D IC Packaging



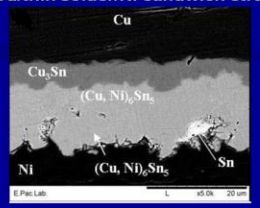
BMG-Bulk Metallic Glass

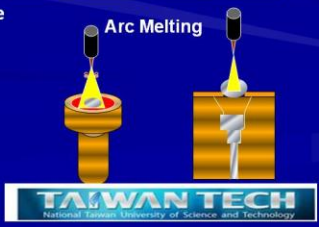
Nano Technology

Carbon nano tubes



Cu/thin solder/Ni sandwich structure





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研究方向

本實驗室屬於國立台灣科技大學材料科學與工程學系，由顏怡文老師所領導。

電子構裝與無鉛銲料之開發是本實驗室之研究專長；而我們的研究領域包括材料科學、相平衡與相圖計算、材料熱力學、半導體光電材料製程、3D IC 構裝。

隨著環保意識與節能減碳觀念興起，相關之綠色材料與新式能源的開發在如火如荼的推動，因此目前亦進行的太陽能、金屬玻璃(Metallic Glass)等相關議題的研究。

BEI-SEM

magnification range:
15x - 30.000

EDS:
Bruker Quantax 70

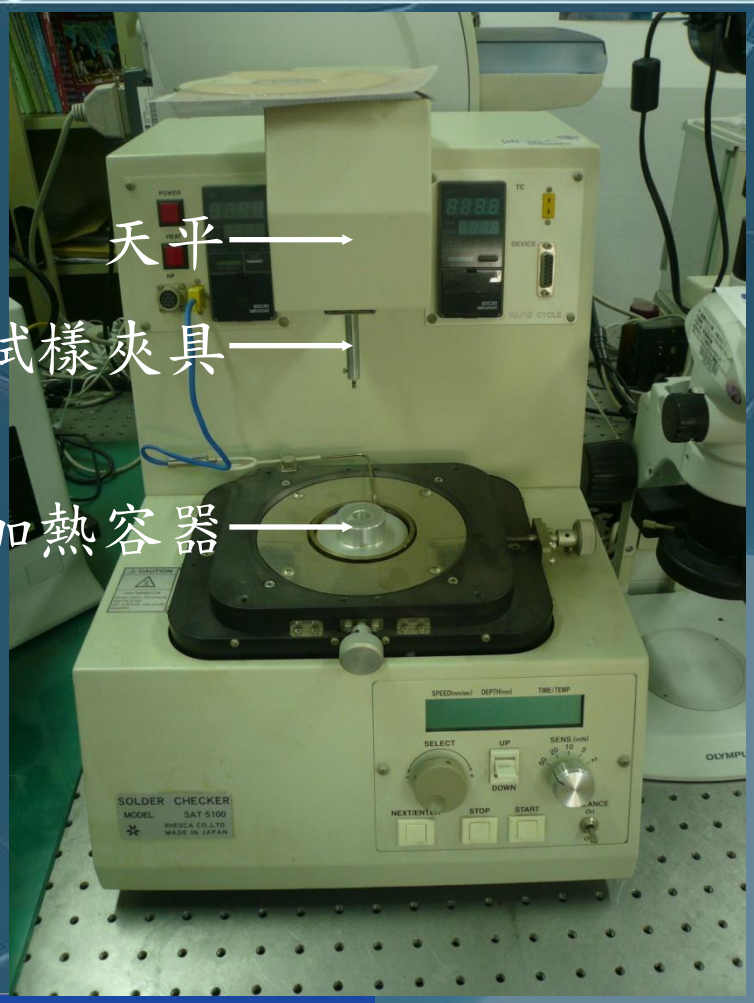
① Light element analysis from boron up (B,C,N,O,F,…)
② Point Analysis selected from SEM Image
③ Line Profile Analysis and Mapping for unlimited elements

Thermal Analysis

Rigaku Thermo Plus
8120DTA-TGA
(T_{max}=1600°C)

TA Q20
(T_{max}=725°C)

潤濕天平



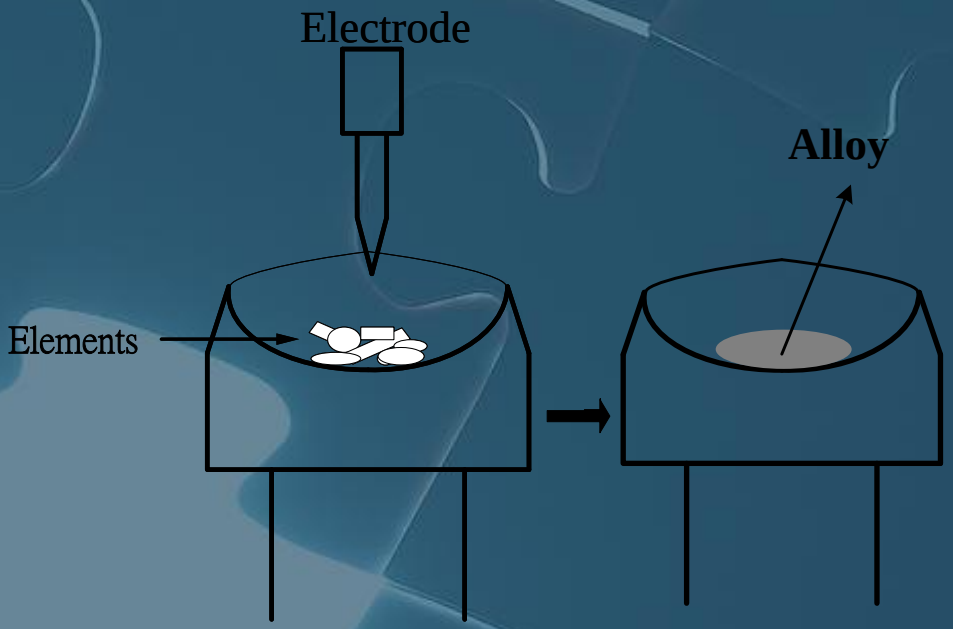
1.濕潤能力判斷
2.表面張力
3.接觸角

萬能拉力機

$Force_{max}$=1 KN

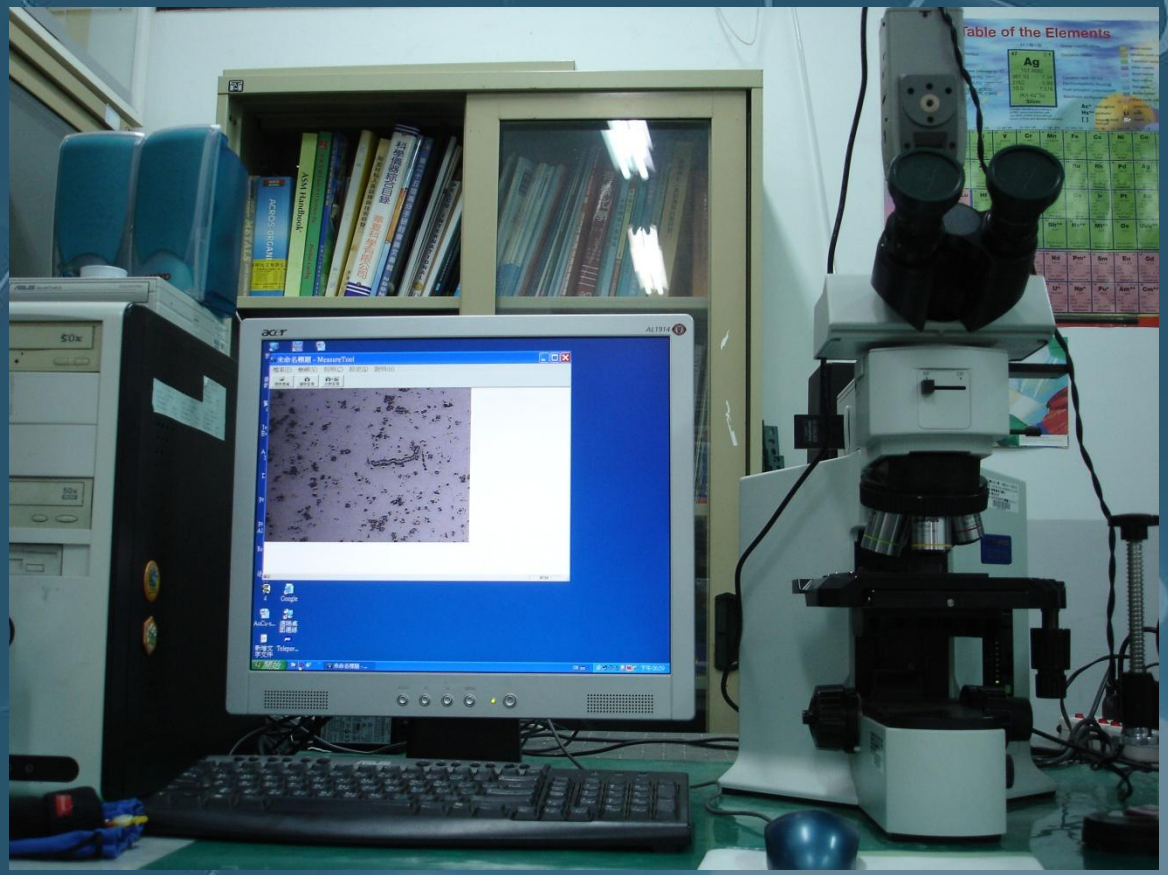
電弧熔煉爐

T_{max}=3500℃



光學顯微鏡OM (名暗視野50X~1000X)

OLYMPUS BX-51M



實體顯微鏡

慢速精密鑽石切割機

BUEHLER

ISOMET 慢速精密切割機

切割轉速：0-300rpm
切割片直徑：3"-5"（75-125mm）
工作荷重：0-300克
工作方式：自動切割

快速精密鑽石切割機

Struers
Ensuring Certainty

Secotom 10

特點:

高速精密型切割機。切割片尺寸75~203 mm，轉速範圍300~5000 rpm，進刀速度0.005~3mm/Sec.，霹靂友善的使用介面、適於切割非常柔軟或非常堅硬的材料、切割質量最高、切割台寬闊定位快速、操作容易，是Struers產品線中最為暢銷的機種。

金相製備

全自動鑲埋機

振動拋光機

金相製備

電鍍設備

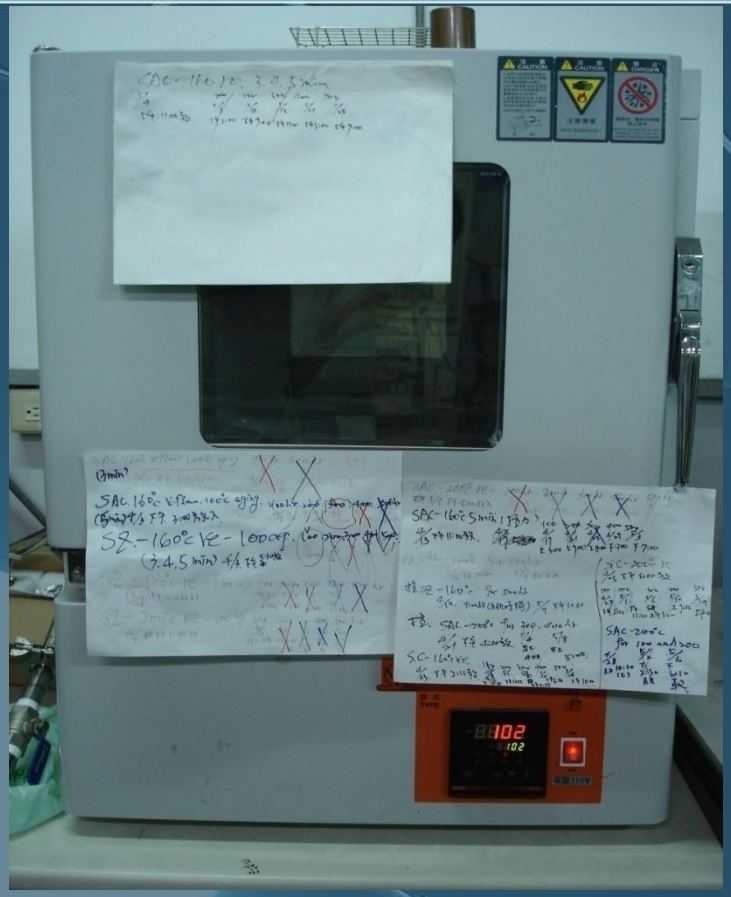
真空封裝系統

冷熱循環機

T=-35~85°C

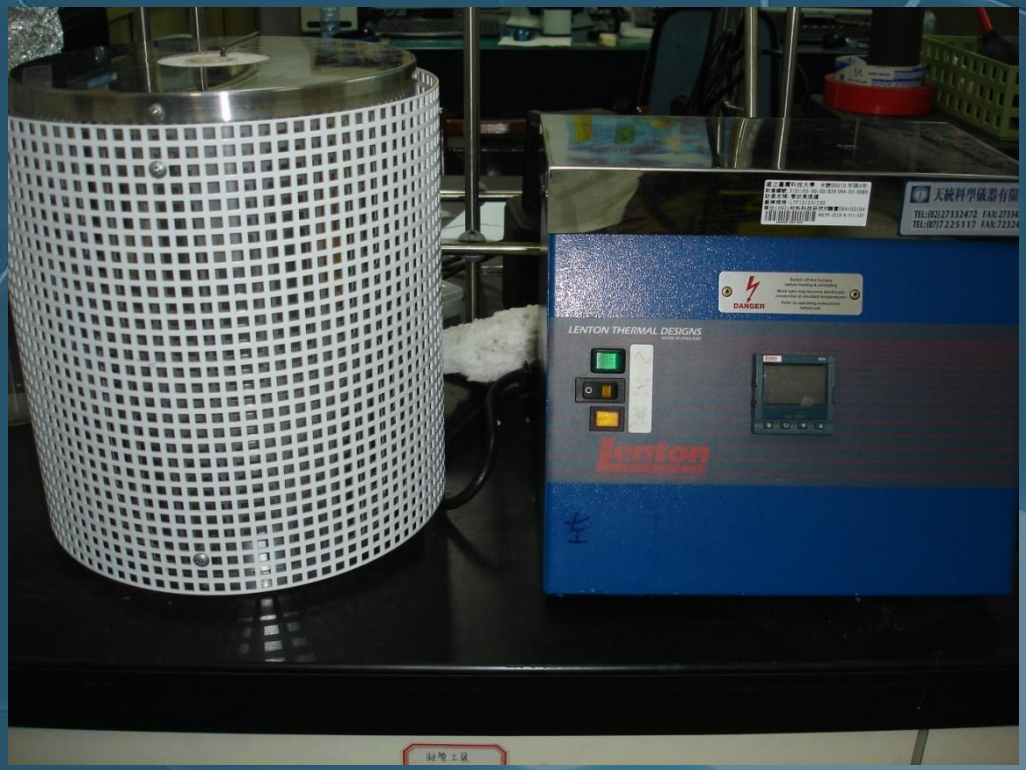
高溫烘箱

T_{max}=450℃



T_{max}=350℃

管狀爐&高溫爐



T_{max}=1200℃

T_{max}=1100℃

高溫爐

T_{max}=1100℃

T_{max}=1400℃

T_{max}=1600℃

Summary

儀器	廠牌/型號	數量	性能
SEM	HITACHI/TM3000	1	X30000
DTA/TGA	RIGAKU/Thermoplus TG 8120	1	T_{max}=1600℃
DSC	TA/Q 20	1	T_{max}=725 ℃
Solder Checker	RHESCA/SAT-5100	1	潤濕時間、應力；表面張力和接觸角
OM	OLYMPUS/BX51M	1	X50~1000
萬能拉力機	SHIMADZU8/AG-IS 1KN	1	1 KN
烘箱 真空烘箱	DENGYNG/RISEN RISEN /DENGYNG DENGYNG	2 5 1	T_{max}=450℃ T_{max}=300℃ T_{max}=300℃
高溫爐 管爐	DENGYNG/ DENGYNG/NEYCRAFT Lenton/DENGYNG	1 5 2/1	T_{max}=1600℃ T_{max}=1100℃ T_{max}=1100℃
Arc Metling	Miller	1	T_{max}=3500℃

材料系貴重儀器設備

- Fourier Transform Infrared Spectrometer (FTIR)
- Ultraviolet-visible Spectrometer (UV)
- Thermogravimetry Analyzer (TGA)
- Differential Scanning Calorimeter (DSC)
- Atomic Force Microscope (AFM)
- Dynamic Mechanical Analyzer (DMA)
- X-ray Photoelectron Spectrometer(XPS)
- SS - Nuclear Magnetic Resonance Spectrometer(SS-NMR)
- Field Emission Scanning Electron Microscope(FE-SEM)
- Small Angle X-ray Scattering System(SAXS)
- Transmission Electron Microscope (TEM)
- High Power X-ray Diffractometer (XRD)
- Dual Beam(FIB)