



欣賢科技  
www.synrex.com

- 關於欣賢 Company
- 產品 Products
- 客戶 Customers
- 協力關係 Partnership



- 欣賢科技於1976年由多位交大電研所畢業生、萬邦電子、與集成電子晶片部同仁共同創立，從事無塵室的設計規劃與承包，以及半導體製程相關設備開發，包含化學清洗工作台、光阻塗佈、顯影、蝕刻等設備。
- 為國內最早投入此一領域的公司之一，率先於1976年研發旋轉塗佈機。伴隨台灣半導體光電產業的發展，客戶遍及國內大學與研究所、研究單位、以及半導體與光電相關產業。
- 於1998年與擎邦國際科技工程股份有限公司合併，成立無塵室事業部，擎邦公司亦承包石化、化工、捷運、與綠色能源等工程業務，並於2001年上櫃(股票代號6122)。
- 2009年自擎邦公司獨立分割出，目前專注於開發新一代半導體光電製程設備，包含面板或光罩產業的大型基板(>500x500mm)旋轉顯影/蝕刻/清洗設備、噴霧塗佈(Spray Coating)、以及狹縫-旋轉塗佈(Slit-spin Coating)、狹縫塗佈(Slit Coating)等設備。



- Established in 1976 by NCTU graduates and former IC manufacturing company employees, Synrex Technology is engaged in the design and construction of cleanroom, and the equipment of semiconductor and optoelectronics which includes chemical wet benches, spin coaters, etchers and developers, etc.
- Synrex is the pioneer in the field of semiconductor equipment manufacturing, including in 1976 the self-developed spin coater in Taiwan. With the growth of Taiwan semiconductor industry, our customers are widespread in university labs, research institutes and companies in related fields.
- Synrex is merged with King Polytechnic Engineering in 1998 to build up the cleanroom business group. King Polytechnic is specialized in plentiful design, erection, commissioning in various conventional and high-tech industries. In 2000, King Polytechnic was listed in Taiwan Stock OTC Market.
- In 2009, Synrex was spun off from King Polytechnic and is focusing on next-gen equipments in semiconductor and optoelectronics, including developers and etchers for large-sized substrates (> 500x500mm) in mask and touch panel industries, spray coaters and slit-spin coaters.



## Products

- **現有產品 Current Products**
  - 旋轉塗佈機 Spin Coater
  - 顯影蝕刻去膜機 Developer/Etcher/Stripper
  - 濕式工作檯 Wet Bench
  - 混酸系統 Dosing System
  
- **新產品 New Products**
  - 狹縫旋轉式塗佈機 Slit-spin Coater
  - 狹縫式塗佈機 Slit Coater
  - 噴塗機 Spray Coater



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# Spin Coater



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## 桌上型伺服旋轉塗佈機系列

### TABLETOP SPIN COATER SERIES

適合實驗室與小批量生產

For laboratory use and low volume production coating applications



2-6吋輕便型旋轉塗佈機  
2-6in portable spin coater



6-8吋旋轉塗佈機  
6-8in spin coater



8吋旋轉塗佈/貼合/IR烘乾多功能塗佈機  
8in spin-coating/bonding/IR-baking multifunctional coater



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## 落地型單頭式塗佈機系列

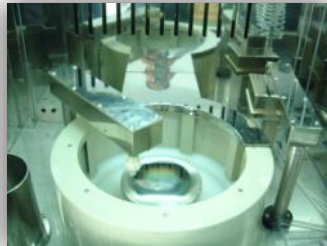
### FLOOR-STANDING SINGLE BOWL SPIN COATER SERIES

可整合多種塗料自動供料、盆罩抽氣控制、晶片中心定位，滿足不同的製程/生產需求。

Integrating multi-materials auto dispense, bowl exhaust, wafer centering, and etc. to meet different process/production requirements.



4吋基板光阻塗佈用  
For 4in wafer PR coating



200x200mm有機TFT開發試產用  
For 200x200mm OTFT R&D



8吋基板光阻塗佈用  
For 8in wafer PR coating



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## 落地型單頭式塗佈機系列

### FLOOR-STANDING SINGLE BOWL SPIN COATER SERIES



285x305mm玻璃基板光阻塗佈用  
For 285x305mm glass PR coating



320x400mm玻璃基板光阻塗佈用  
For 320x400mm glass PR coating



320x400mm玻璃基板光阻塗佈用  
For 320x400mm glass PR coating



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## 落地型多頭式塗佈機系列

### FLOOR-STANDING MULTIPLE BOWLS SPIN COATER SERIES



2吋基板光阻塗佈用  
For 2in wafer PR coating

2吋基板光阻塗佈用  
For 2in wafer PR coating

100x100mm陶瓷基板光阻塗佈用  
For 100x100mm ceramic PR coating



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# Developer/Etcher/Stripper



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## 落地型單頭•多頭式顯影機系列

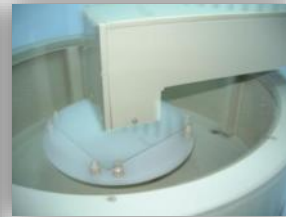
FLOOR-STANDING SINGLE/MULTIPLE DEVELOPER SERIES



200x200mm玻璃基板顯影蝕刻用  
For 200x200mm glass  
developer/Etcher



200x200mm玻璃基板顯影蝕刻用  
For 200x200mm glass  
developer/Etcher



8吋基板顯影蝕刻用(微機電)  
For 8in wafer developer/Etcher  
(MEMS)



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## 大尺寸顯影·蝕刻·去光阻·清洗系列

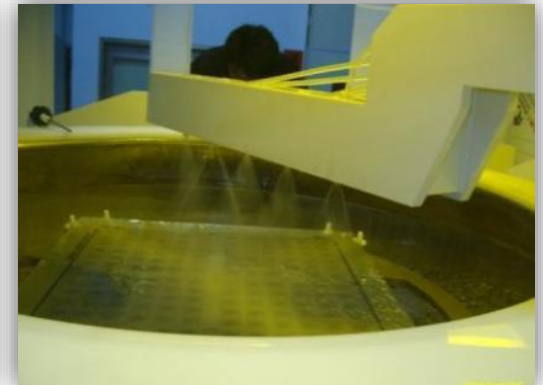
LARGE-SIZED DEVELOPING/ETCHING/STRIPPING/CLEANING SERIES

搭配德國海德堡高精密光罩繪圖機

Accompanied with Germany Heidelberg Photomask Writing System



24x28吋鍍絡光罩生產用  
For 24x28in chrome photomask  
production



供料方式 Dispense Type : 自動顯影/蝕刻/去光阻手臂  
Auto Developing/Etching/Stripping Arms  
基板上下載 Substrate Load/unload : 自動 Auto



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## 大尺寸顯影·蝕刻·去光阻·清洗系列

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## 大尺寸顯影•蝕刻•去光阻•清洗系列

LARGE-SIZED DEVELOPING/ETCHING/STRIPPING/CLEANING SERIES

搭配德國海德堡高精密光罩繪圖機

Accompanied with Germany Heidelberg Photomask Writing System



550x650mm 觸控玻璃生產用  
For 550x650mm TP glass production



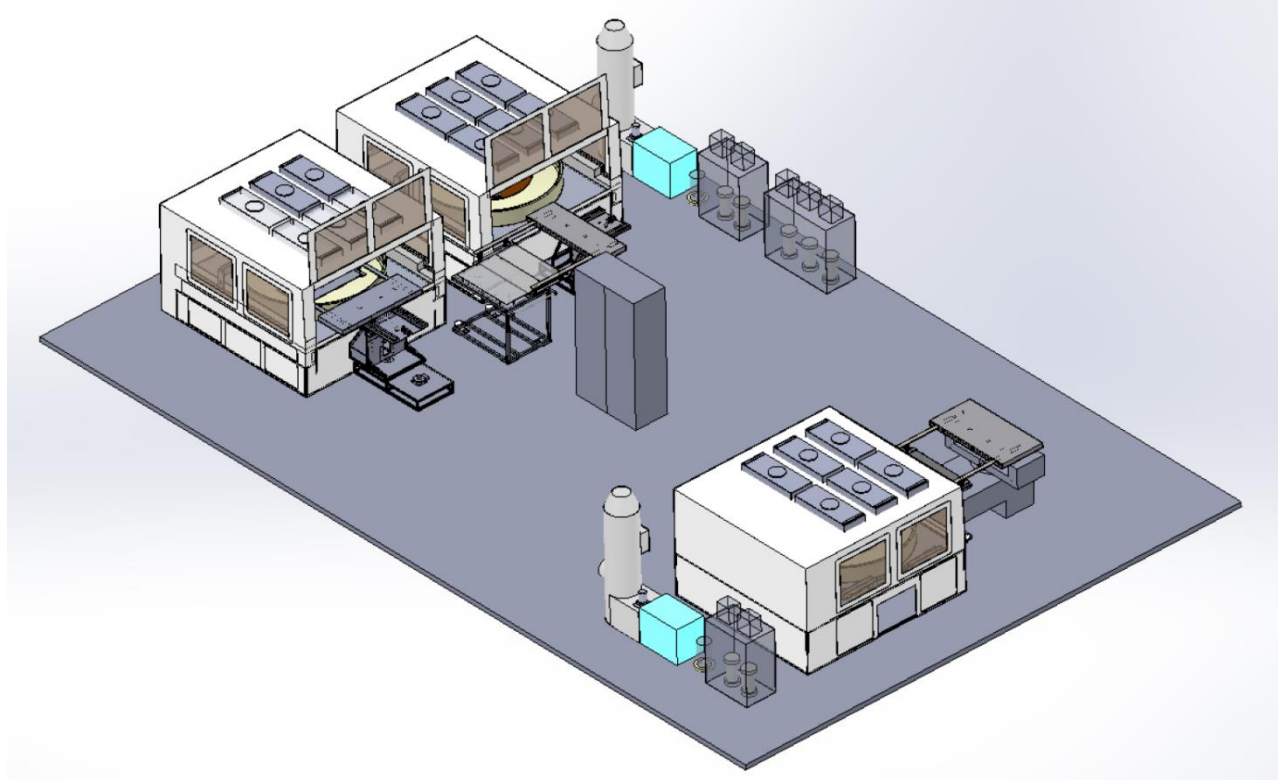
供料方式 Dispense Type : 自動顯影手臂  
Auto Developing Arms

基板上下載 Substrate Load/unload : 自動 Auto



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# 1.1×1.2m光罩玻璃 清洗/製程設備規劃案

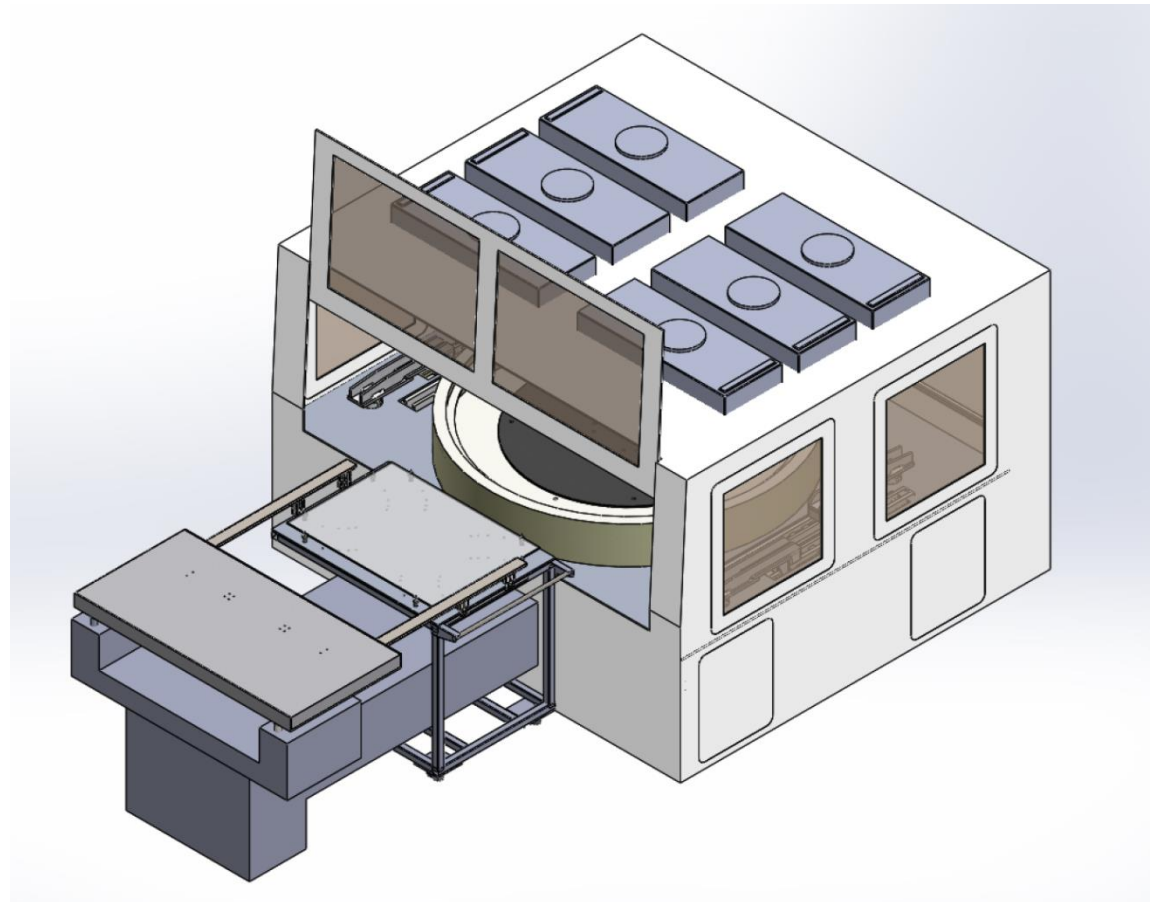




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# 1.1×1.2m光罩玻璃清洗設備

- 線寬/線距：2-5 $\mu$ m
- PLC操作介面
- 供藥槽
- 藥液噴灑手臂
- DI噴灑手臂
- WALL NOZZLE ARM

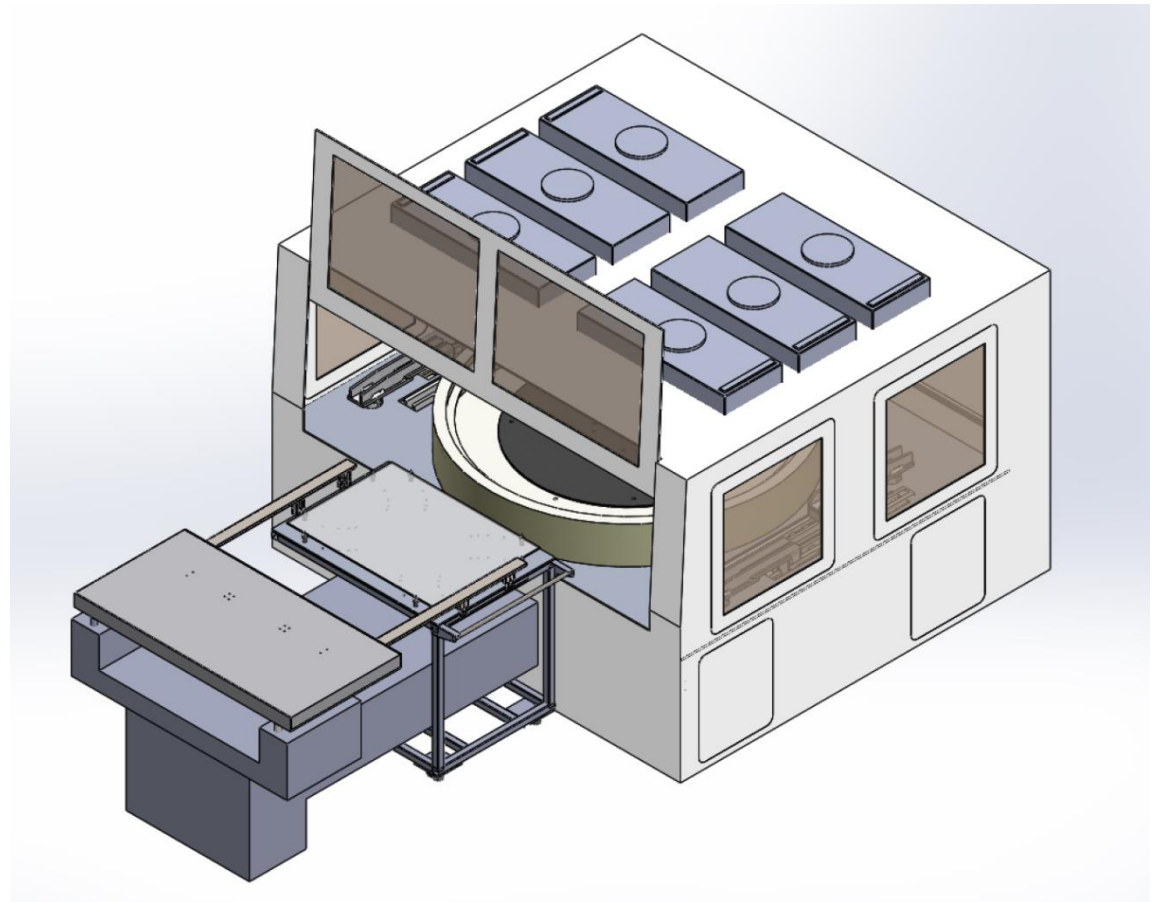




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# 1.1×1.2m光罩玻璃製程設備

- 顯影/蝕刻/去光阻
- PLC操作介面
- 供藥槽
- DEV 噴灑手臂
- DI 噴灑手臂
- ETCHER 噴灑手臂
- WALL NOZZLE ARM





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# Wet Bench



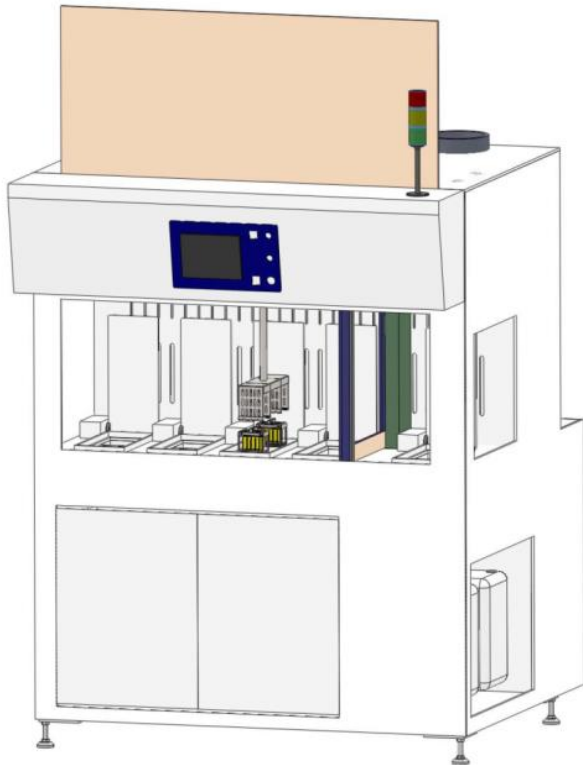
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www.synrex.com

## 有機/酸/鹼濕式工作站系列 ORGANIC/ACID/ALKALI WET BENCH SERIES





## 自動有機/酸濕式工作站 AUTO ORGANIC/ACID WET BENCH



封裝金/鋁線蝕刻分析用  
For Packaging Au/Al Wire  
Etching and Analysis

- 藥液槽：王水加熱、磷酸加熱、QDR、熱N2、丙酮  
Tanks: Heating Aqua Regia, Heating H3PO4, QDR, Hot N2, Aceton
- 自動藥液供應與排放 Auto Chemicals Supply and Drain
- 自動傳送手臂 Auto Transfer Arm
- 酸與有機抽氣排放 Acid/Organic Exhaust
- 觸控人機介面與製程參數管理 Human Touch Interface and Recipe Management
- CO2消防防護 CO2 Fire Protection



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# Dosing System



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# CIGS 生產線混酸系統

## DOSING SYSTEM FOR CIGS PRODUCTION





## 經濟部工業局102年度計畫 - OLED元件之精密塗佈設備開發

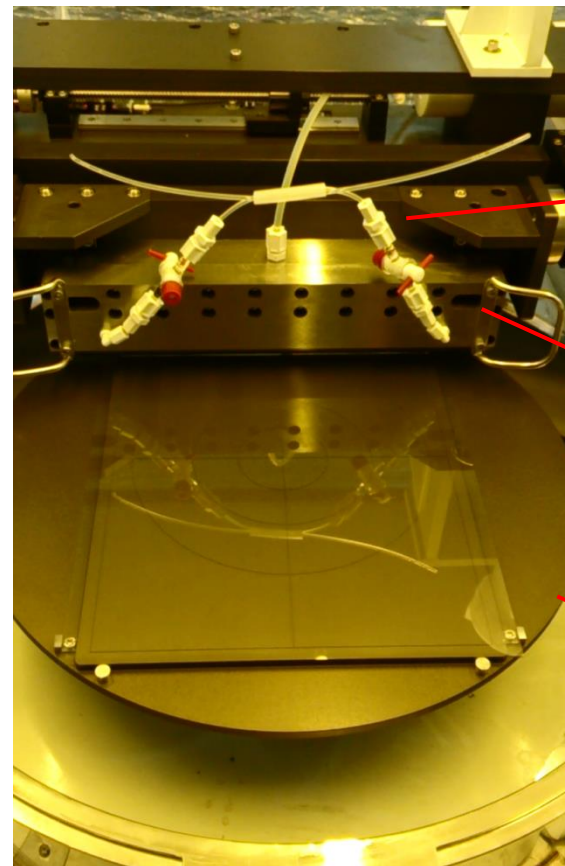
- 低黏度(1-200cp)精密Slit-spin Coater設計及建置。
- 低黏度狹縫塗佈頭(Slot Die)、旋轉基板載盤(Chuck)、針筒(Syringe)供料與排氣系統設計與建置。
- 電控及操作軟體自行開發與建置。
- 塗佈流變製程參數建立(工研院)。
- 有機材料表面張力、溫度揮發曲線參數建立(工研院)。
- 薄膜之精密塗佈驗證(工研院)。



## Slit-spin Coater 驗證平台



Slot Die



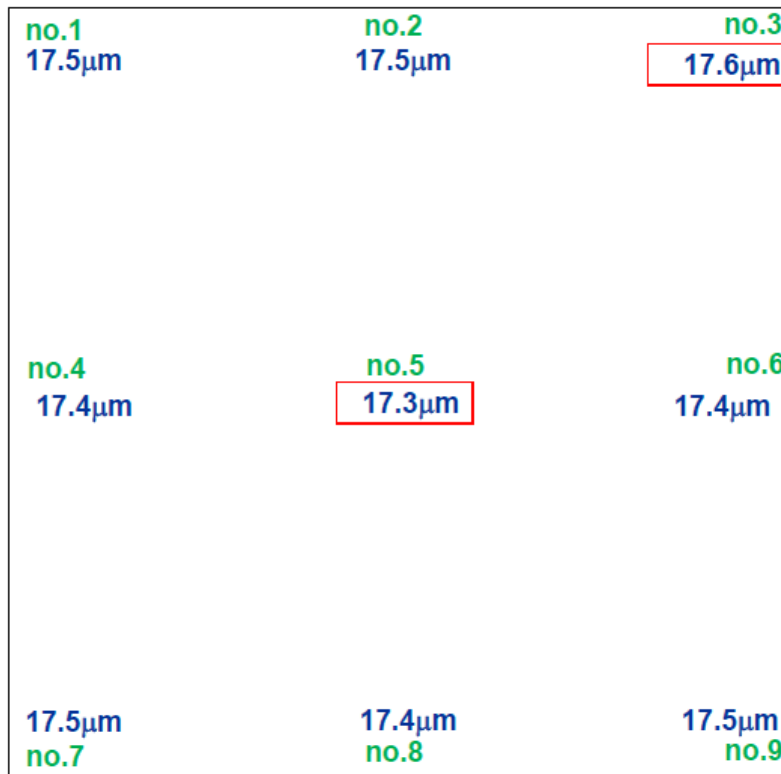
Air Venting

Slot Die

Spin Chuck



## Slit-spin Coating Uniformity



### Thick Film PR Coating Test

- Substrate :
  - Glass
  - 300×300×0.7mm
- Photo Resist
  - Viscosity : 700~1000cps
  - S.C. : 42%
  - PR Usage : 8.4cc

無效邊15mm:9點ERROR:0.86%



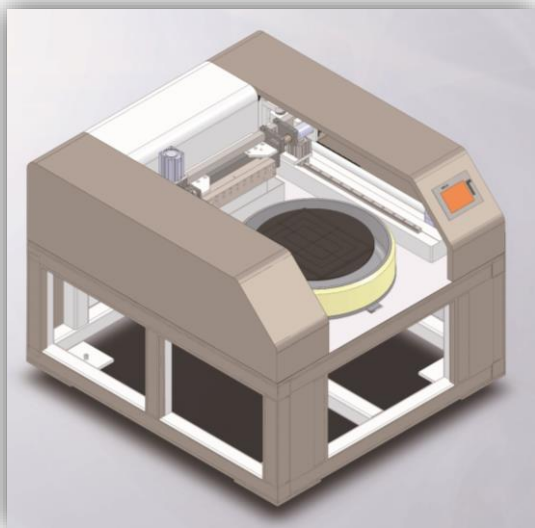
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## 320x400mm狹縫旋轉式塗佈機

### 320x400mm SLIT-SPIN COATER

狹縫旋轉式塗佈為一高塗料利用率、性價比高的塗佈方式，適合於高價值塗料的塗佈應用，包含聚醯亞胺(PI)、與觸控面板、FPD與OLED相關領域的塗料。

Slit-spin coating is capable of high material utilization and high performance/cost ratio, suitable for materials as polyimide and in fields of touch panel, FPD and OLED.



塗佈方式 Coating Type : 狹縫塗佈頭給料+基板旋轉 Slot die dispense +substrate spinning

平台 Platform : 龍門移動方式 Gantry moving type

基板尺寸 Substrate size : 320x400mm

塗料供應 Material supply : 注射式幫浦 Syringe pump

管路排氣 Piping air release : 塗佈頭排氣模組 Die air release module

塗料黏度 Material viscosity : 1~100cps

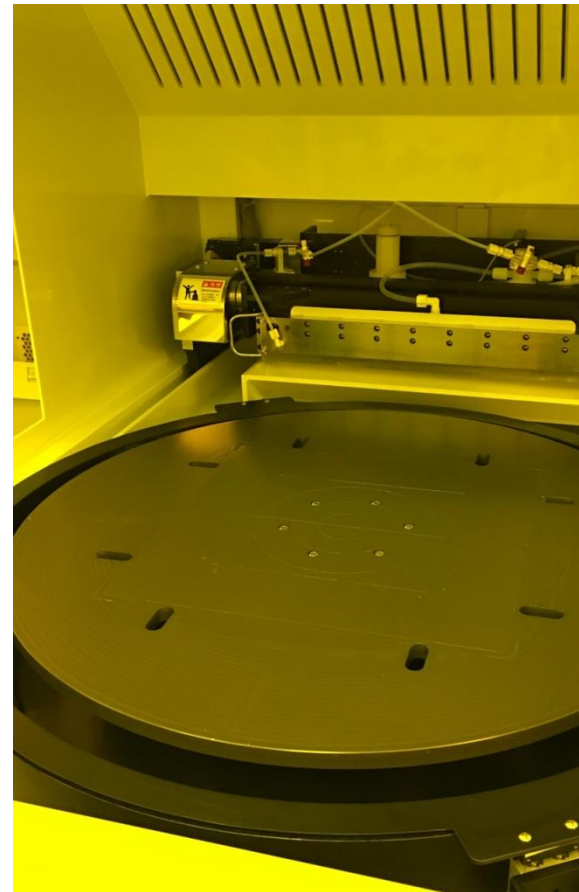
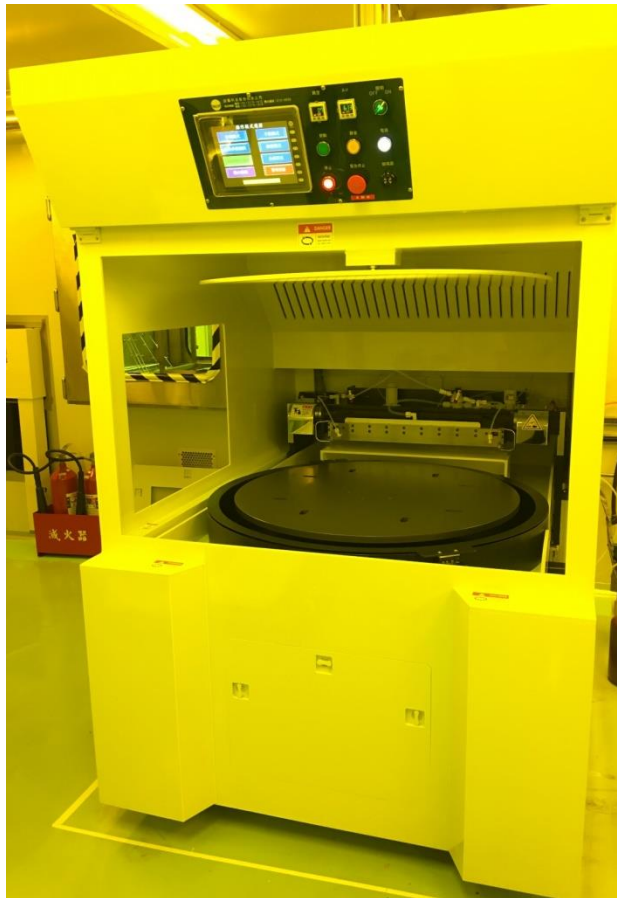
塗層厚度 Coating thickness : 1~100 $\mu$ m (乾膜 Dry film)



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## 500x500mm狹縫式旋轉塗佈機





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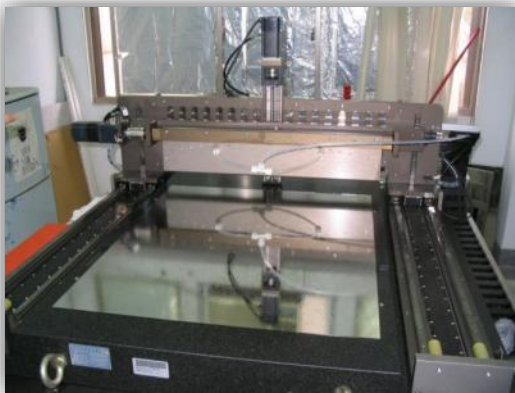
# Slit Coater



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## 620x750mm狹縫式塗佈機

### 620x750mm SLIT COATER

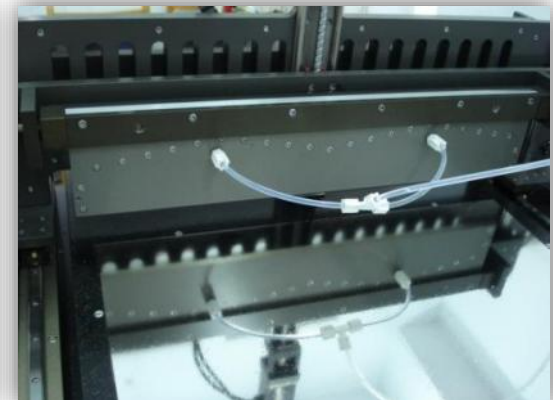
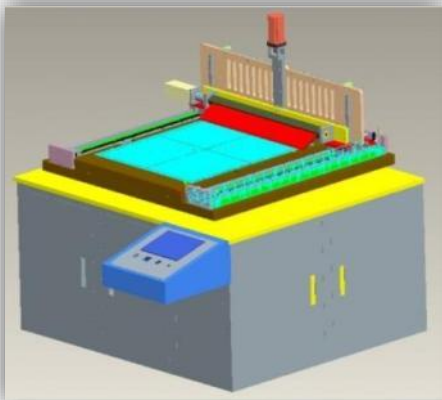


與國立中央大學機械所合作開發

Co-work with National Central University Department  
of Mechanical Engineering

花崗石平台 Granite table : Surface Roughness  $< \pm 3\mu\text{m}$

塗佈速度 Coating speed : 200mm/s max.



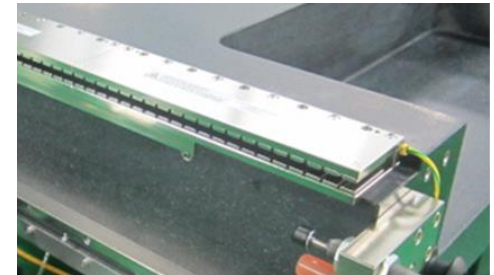
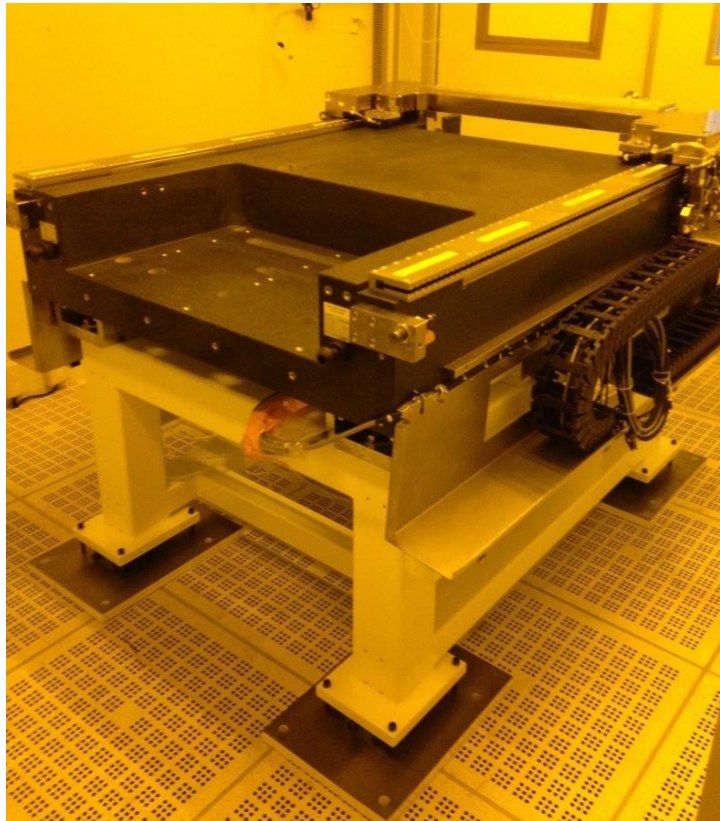


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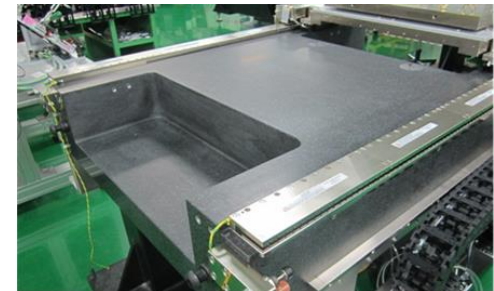
## 高黏度Slit Coater驗證平台



空氣軸承(浮動間隙: 5~15 $\mu$ m,  
負載: 150kg)



線性馬達(最大速度: 200mm/s,  
最大加速度: 2000mm/s<sup>2</sup>)



花崗石平台(塗佈區平整度:  
<3 $\mu$ m,塗佈面積: 320\*400(mm<sup>2</sup>))



光學尺定位(解析度0.1 $\mu$ m,  
精度5 $\mu$ m)



## 高黏度Slit Coater驗證平台

- 高黏度Slot Die流道設計與製作(三菱)。
- Slot Die垂直升降之加/減速設備設計與建置。
- 即時塗佈間隙(Coating Gap)零點校正與監控系統。
- 高黏度塗佈供料與排氣系統設計。
- Die唇口清潔設備。
- 電控與操作軟體的自行開發與最佳化。
- 設備開發與材料供應商配合，依材料特性設計塗佈機規格與操作參數。



## 高黏度Slit Coater應用

- PI(4000-6000cp)
- 高黏度光阻(>200cp)
- OCR(4000-8000cp)



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# Spray Coater

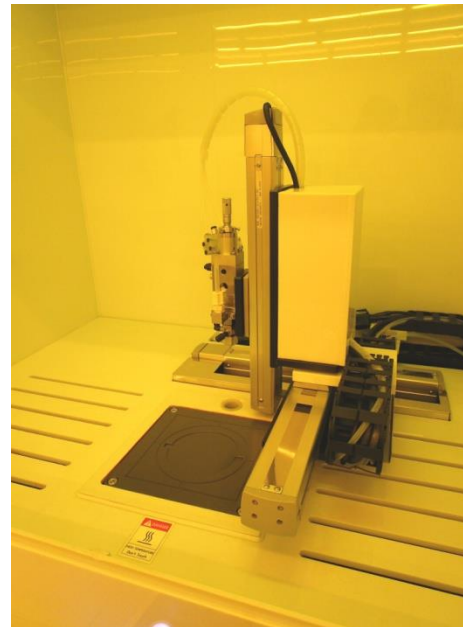


# Spray Coater

- Dimension : 1300(W) ×1250(D) ×1900(H)
- Coating Area : 250mm Square
- Heating Plate : 300mm Square 120 °C Max.
- Dual Syringe & Auto Pumping System
- Scan Speed X/Y/Z = 300/200/60 mm/s



Dual Syringe  
Circulation System  
to avoid  
gravitational  
settling.



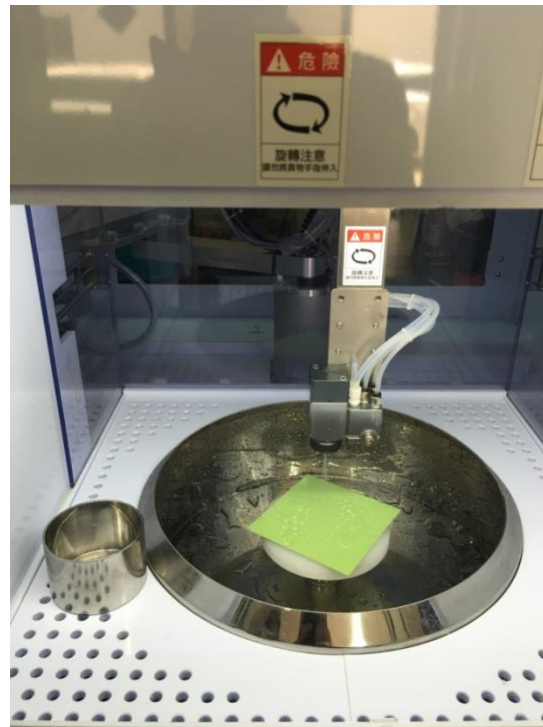
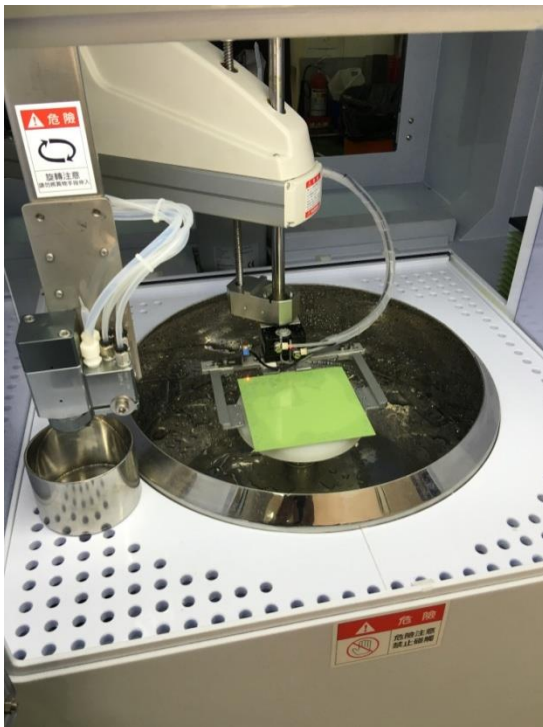
Semi-auto Spray  
Coater



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# Spray Coater

Auto Cassette-to-Cassette Spray Coater





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www.synrex.com

# Steel Plate AF/AS Spray Coating System

- Coating Width : 1600mm Max
- Anti-fingerprint Coating
- Spray Guns : 16 Sets
- Auto Coating Material Supply
- Clean Booth with HEPA FFU





# 3D Glass Spray Coating

- Substrate : 5in 3D Glass
- PR : Black Matrix
- Dry Film Thickness : 6 $\mu$ m      After
- Process Time : 1min
- PR Usage : 1cc



Before



	Measured Point #1	Measured Point #2	Measured Point #3	Measured Point #4	Measured Point #5
Sample #1	5.94	5.92	5.80	6.11	6.09
Sample #2	6.27	6.00	5.81	5.37	6.19

Unit :  $\mu$ m



## 噴霧式塗佈優點

### ADVANTAGES OF SPRAY COATING

- 針對高深寬比或3D立體結構，克服旋轉式塗佈階梯覆蓋不佳的缺點  
Good step coverage of coating on high topography substrate surfaces compared to conventional spin coating.
- 可靜止或低轉速噴塗，避免旋轉式塗佈因離心力造成塗料流動，在凹槽結構底部或側壁產生塗料堆積的現象。  
Prevent coating material accumulation in cavity bottoms or sidewall edges.
- 與旋轉式塗佈約2%塗料可使用量比較，噴霧式塗佈可提昇塗料用量(15%~40%)。  
High material utilization of 15%~40% compared to spin coating of around 2%.



## 噴霧式塗佈優點

### ADVANTAGES OF SPRAY COATING

- 可多件小尺寸基材同時塗佈，例如1x1 inch基材。

**Capable of coating multiple small-sized substrates as 1x1 inch.**

- 脆弱結構的保護層塗佈，例如MEMS的懸臂樑結構，可避免旋轉式塗佈的離心力破壞。

**Capable of protection coating on fragile structures such as cantilever beams of MEMS, which centrifugal force of spin coating can cause damage.**



欣賢科技

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# Customers



# 欣賢科技

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工業技術研究院  
Industrial Technology  
Research Institute



Everlight  
Chemical  
永光化學



洲磊科技

## Unimicron

欣興電子



台灣捷恩智股份有限公司  
JNC Taiwan Co., Ltd



泰谷光電



佳邦科技



景碩科技股份有限公司  
KINSUS INTERCONNECT TECHNOLOGY CORP



ELECTRONIC  
MATERIALS



晶發半導體



三安光电股份有限公司  
San'an Optoelectronics Co., Ltd.



-film 欧菲光



晶元光電



矽品精密



蘇州晶方



AxunTek 綠陽光電股份有限公司  
Solar Energy



微邦科技股份有限公司  
MicroBase Technology Corporation



統懋半導體股份有限公司  
MOSPEC SEMICONDUCTOR CORP.



國喬石油化學股份有限公司  
GRAND PACIFIC PETROCHEMICAL CORPORATION



華星光通  
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