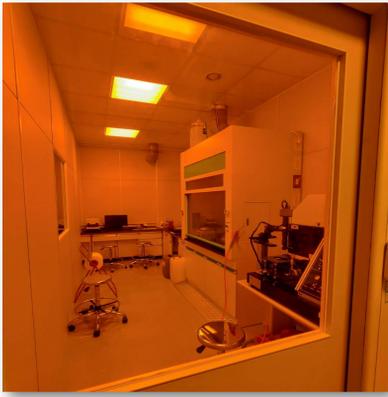


半導體黃光微影

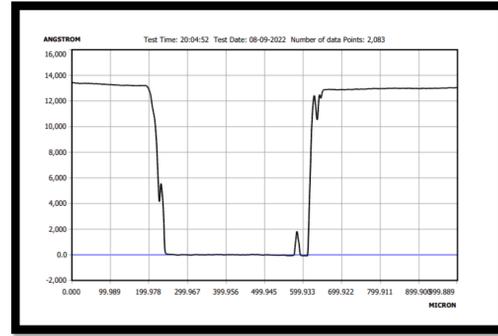
黃光減塵室



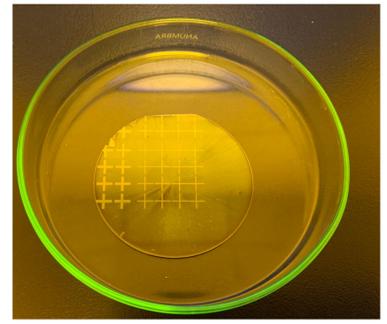
Alpha Step



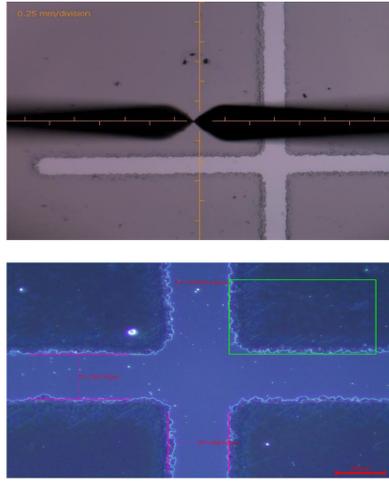
Developed photoresist profile



Si wafer



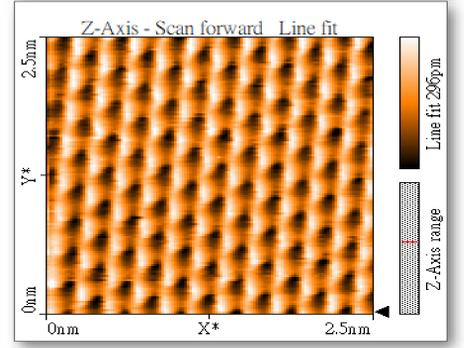
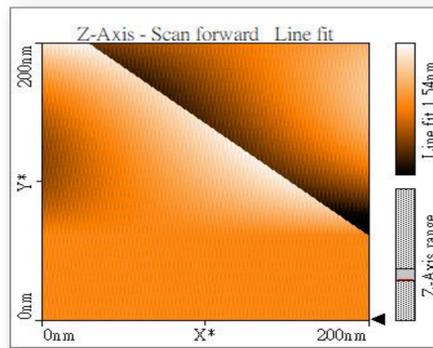
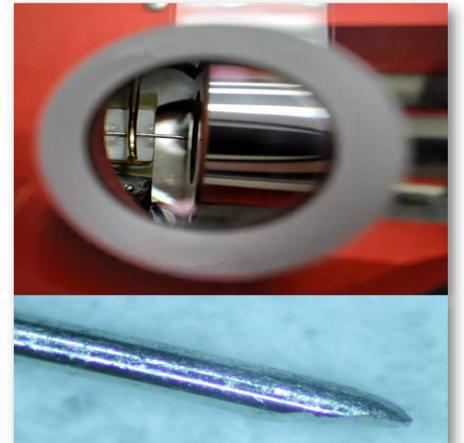
Mask Aligner



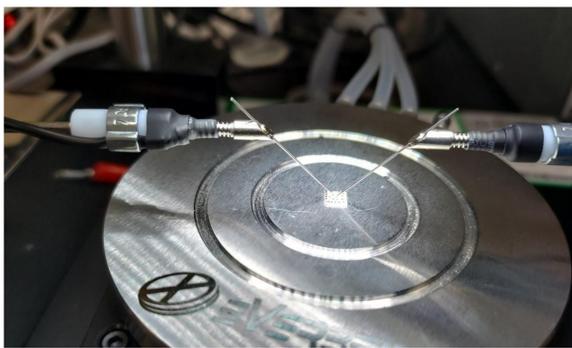
- 黃光減塵室提供清潔的實驗場域，透過晶圓的清洗、光阻塗佈、曝光、顯影等步驟，可以將半導體元件的設計轉移到晶圓上。
- 對準曝光儀(Mask Aligner): 提供短波長紫外光，可以將光罩上的毫微米設計線路轉移至半導體晶圓上。
- 厚度量測儀(Alpha Step): 用來檢驗曝光顯影後光阻的膜厚、晶圓蝕刻的深度及金屬或其他材料鍍膜後的厚度，解析度可達奈米等級。

STM/STS量測系統

- 掃描穿隧顯微鏡-Scanning tunneling microscope (STM) : 利用針尖與待測樣品間的穿隧電流可以讓STM量測原子等級的樣品表面結構與形貌。
- STM亦可利用穿隧電流效應進行穿隧電流能譜(scanning tunneling spectroscopy)的量測，用來研究奈米級粒子的特性。

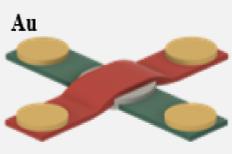


探針量測系統



- 探針量測系統結合高精度電流與電壓源可進行高精準度的電性量測。
- ZnO材料的阻性開關(Resistive Switching)特性研究。

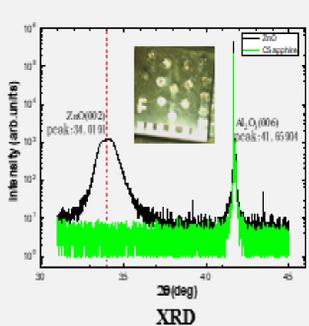
Tri-layered Device



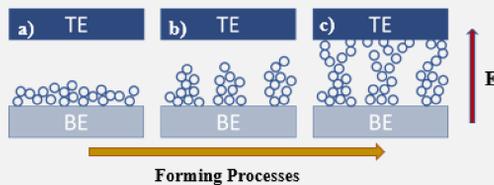
Cross section view

ZnO(50nm)
ZnO(20nm)
ZnO(50nm)

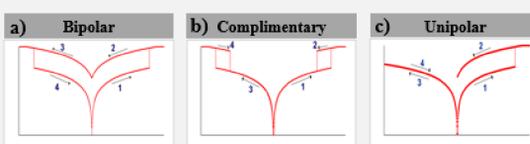
400 °C/1x10⁻³ mbar



Theory

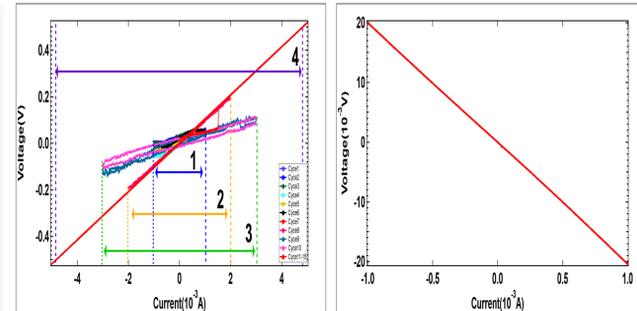


- Without conduction filaments (CF) formed, the device is at its high resistance state (HRS). [4]
- ,c) Bias voltage across the active layer helps forming of the conduction filaments between top and bottom electrodes. The device switch from HRS to LRS. [4]



Three types of resistive switching (RS):

- Set and reset of switching happen at opposite side of bias voltage.
- Set and reset can happen on both sides of bias voltage.
- Set and reset can only happen on one bias voltage side.



- A transverse voltage(a) were measured in the bottom layer while the current flew on the top layer.
- High and low resistance states were observed in the 4-point measurement.