晶程所製，電晶為開
---電晶體製成概述

小哥哥小姐姐講半導體:
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- 二極體介紹
- 電晶體介紹
- 電晶體製程
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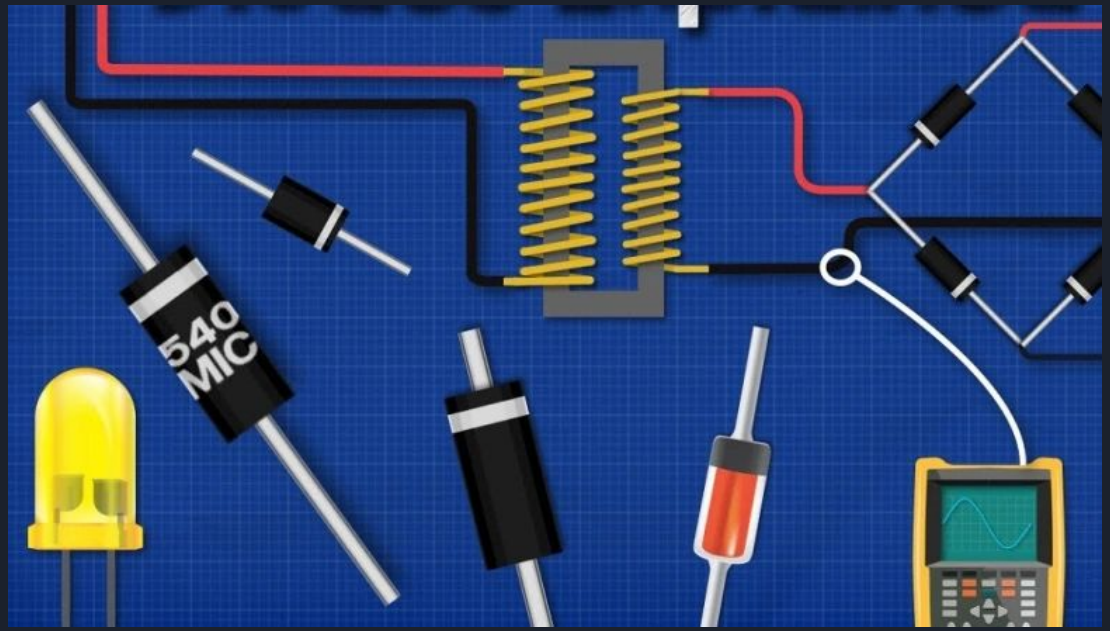
半導體簡介：

- 甚麼是半導體？
- 半導體的主要材料？

二極體是什麼?

- 具有不對稱陰陽兩端的電子元件



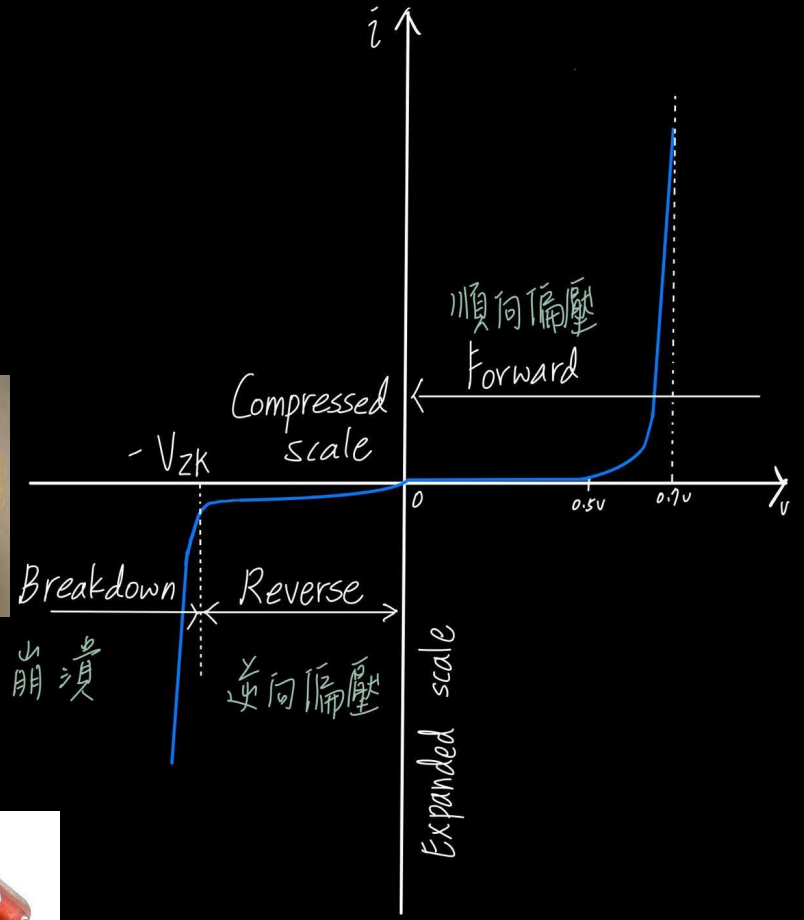
一般

蕭特基

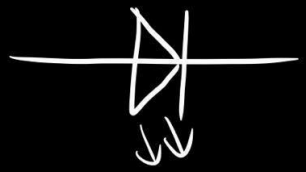
隧道

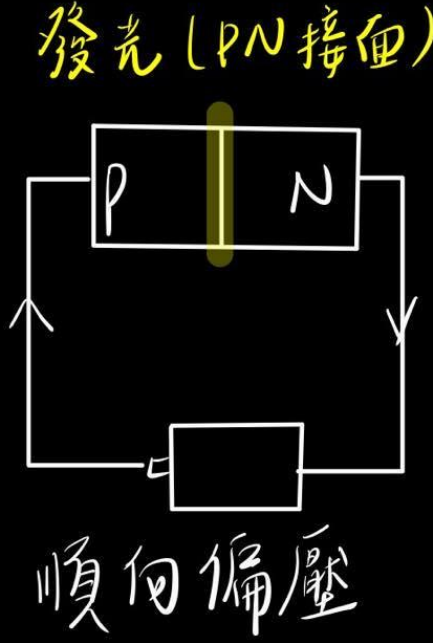
變容

齊納



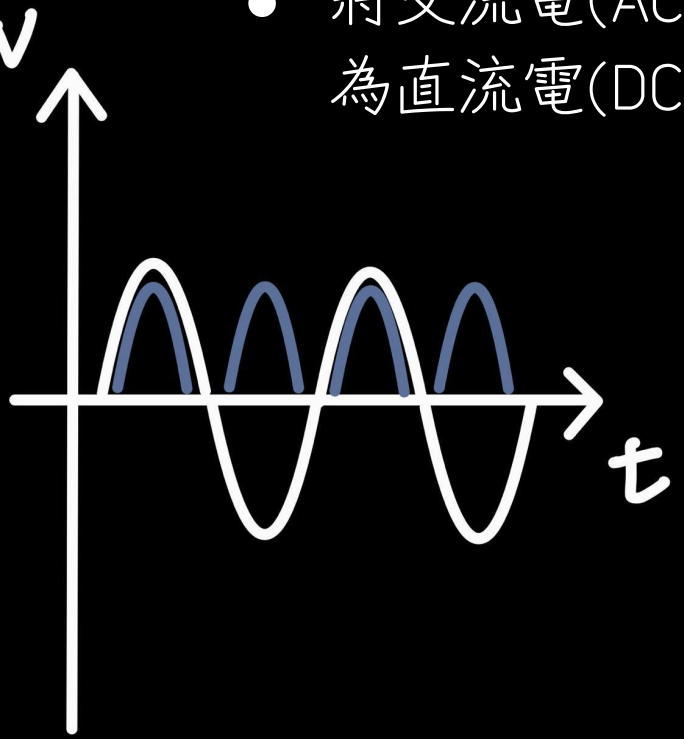
發光二極體

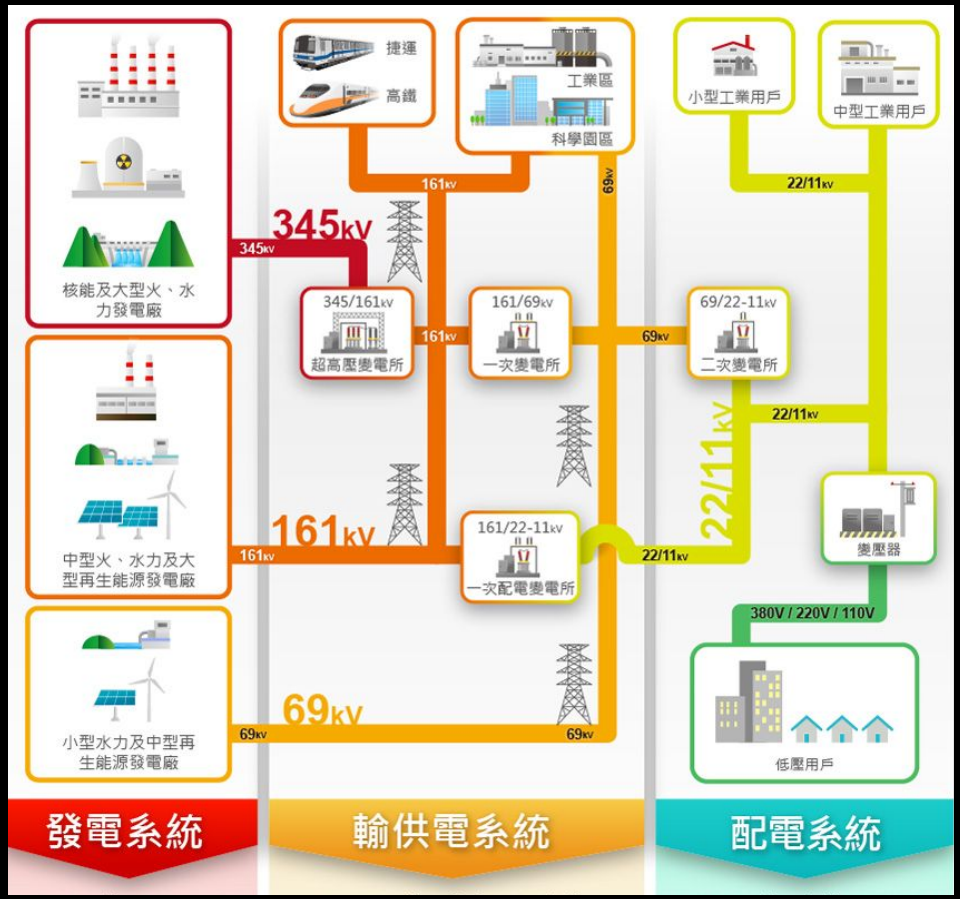




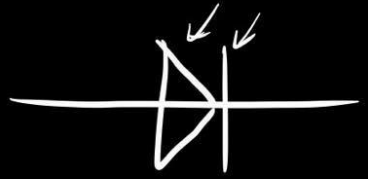
整流二極體

- 將交流電(AC)轉為直流電(DC)

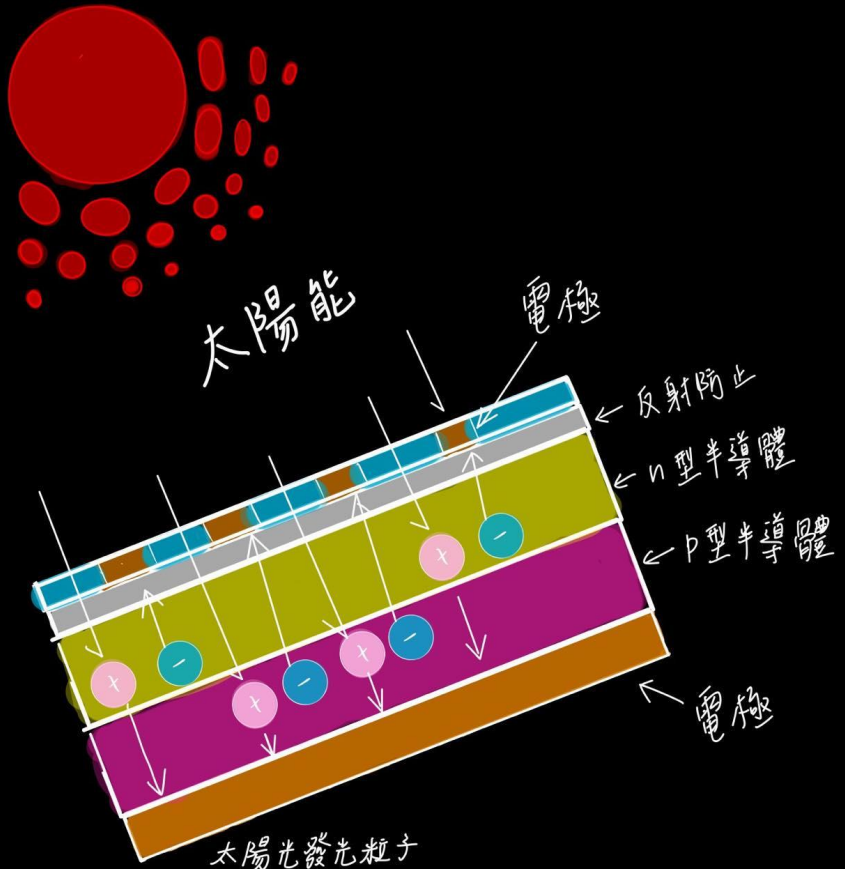




太陽能電池

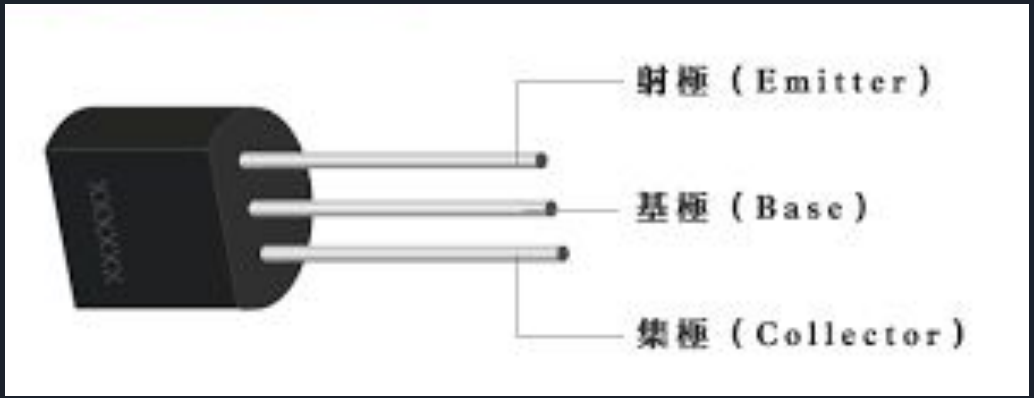


由P型半導體和N型半導體構成，當適當光線照射到太陽能電池模組時，光能激發電子，造成電位差，配合外加的導線電路，即可產生電流



電晶體介紹

- 一種微型元件，用於控制和調節電子信號的流動，可作為放大器及開關。
- 分為BJT & FET

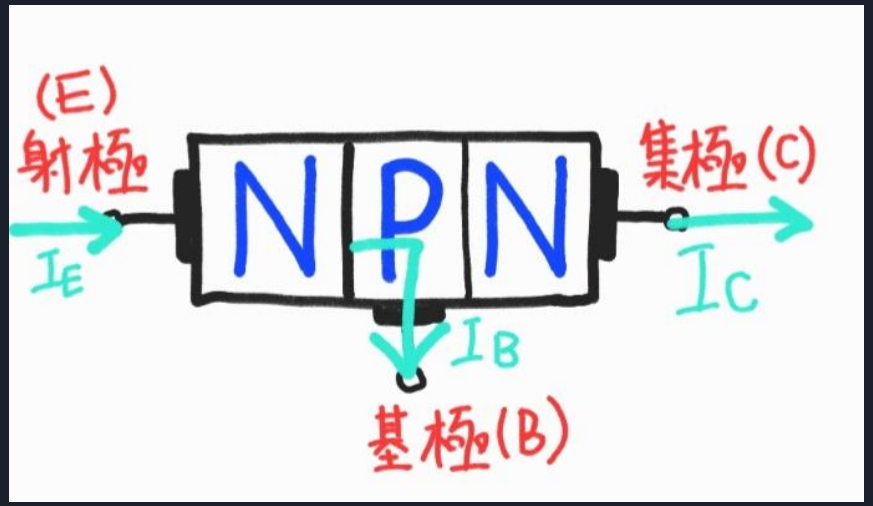


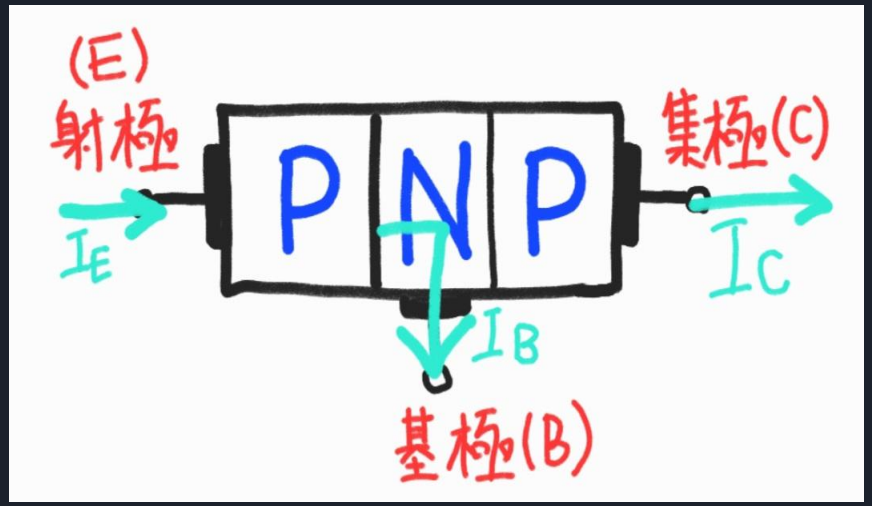
雙極性接面電晶體(BJT)

P-N接面二極體＋N/P型半導體，分為NPN & PNP。

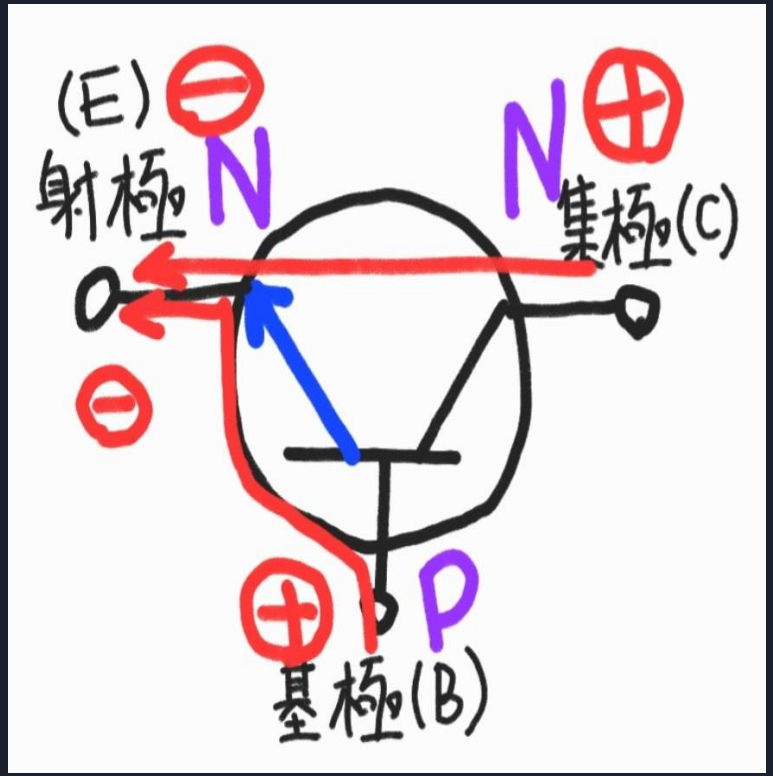
NPN:N型為射極，N型的多數載子為電子。

PNP:P型為射極，P型的多數載子為電洞。

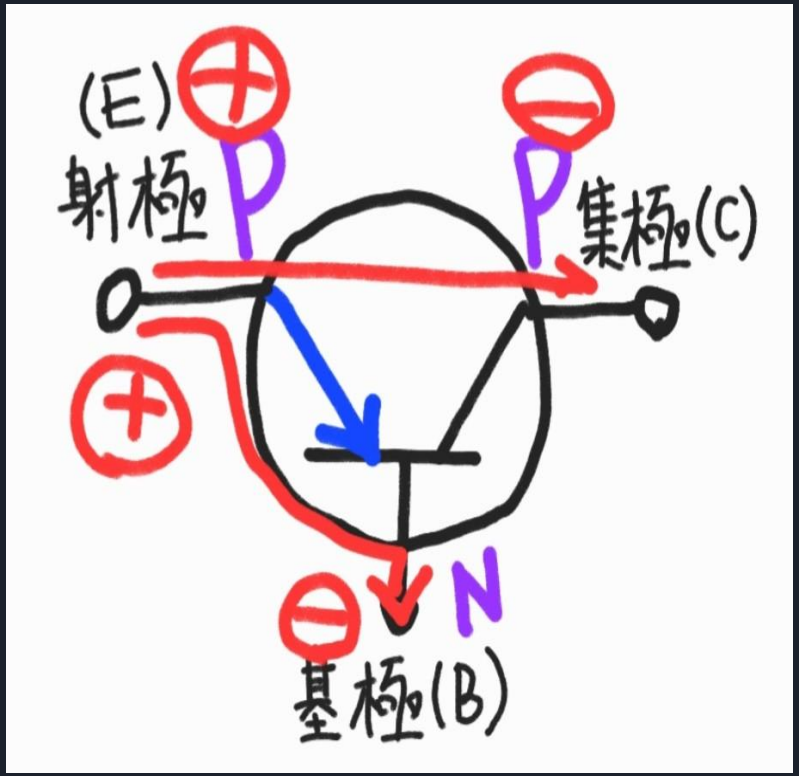




NPN



PNP

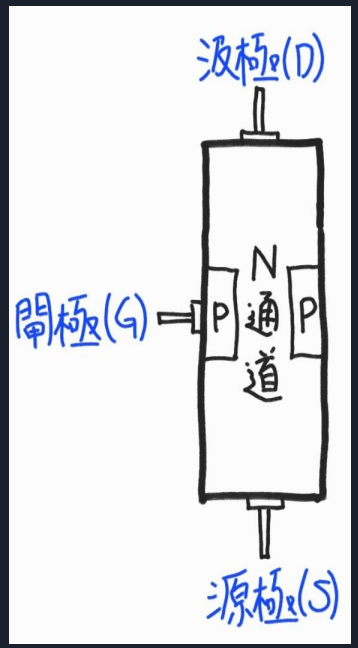


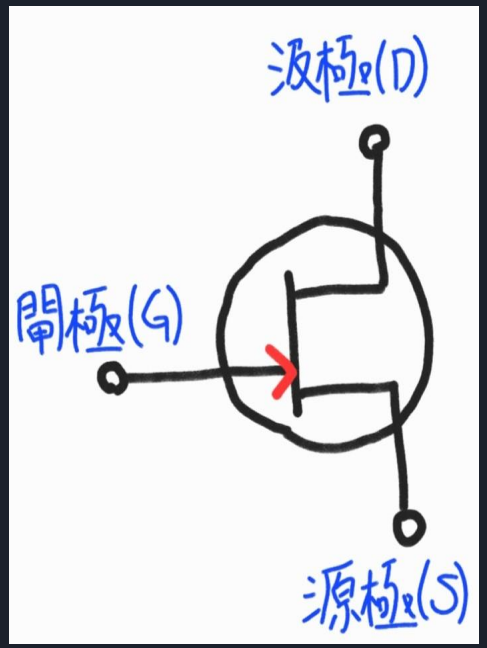
電場效應電晶體(FET)

分類:

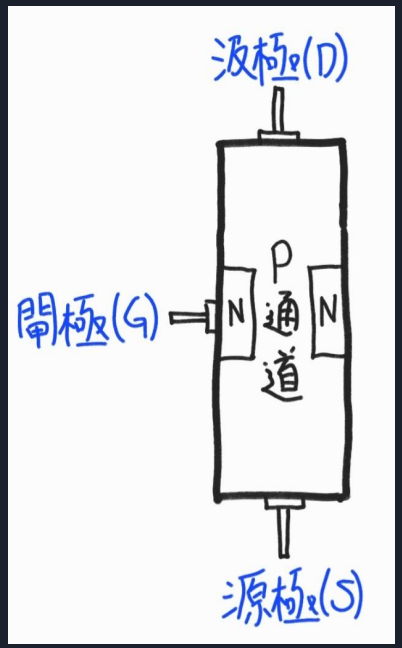
- JFET(接面場效電晶體): 分為P通道和N通道
- MOSFET(金屬氧化物半導體場效電晶體))(1)D-MOSFET(空泛型):分為P通道和N通道
  (2)E-MOSFET(增強型):分為P通道和N通道

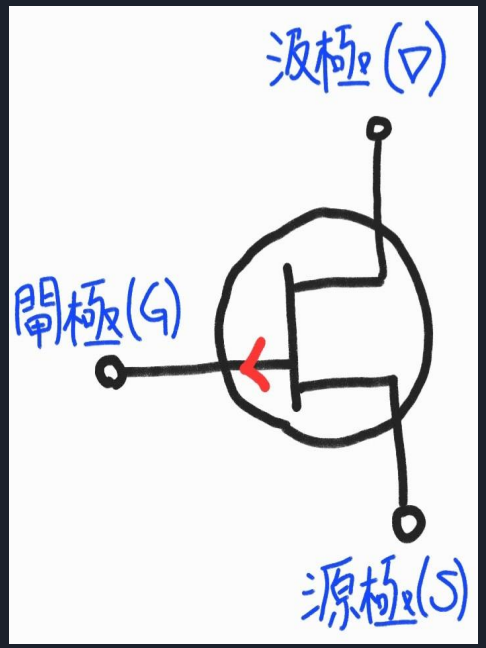
NCH JFET

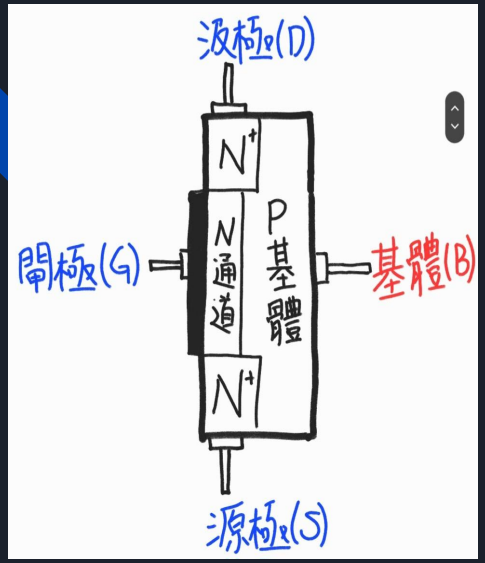


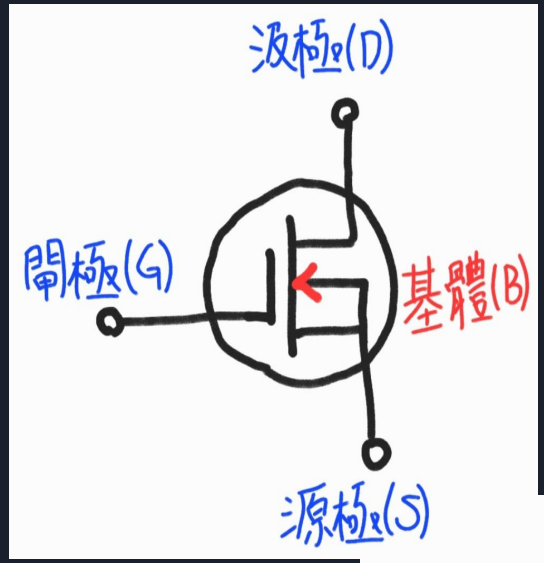


PCH JFET



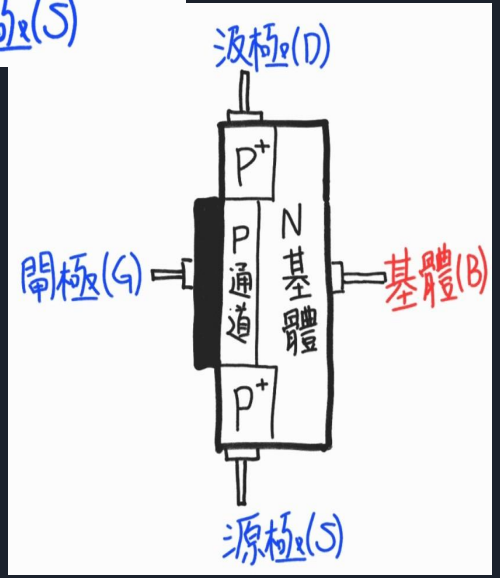


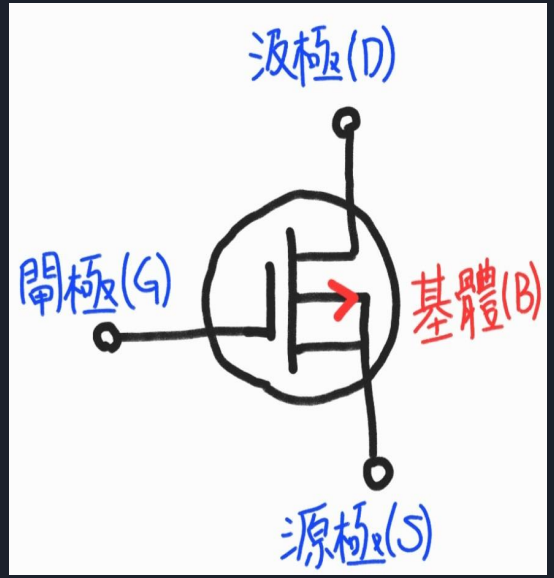


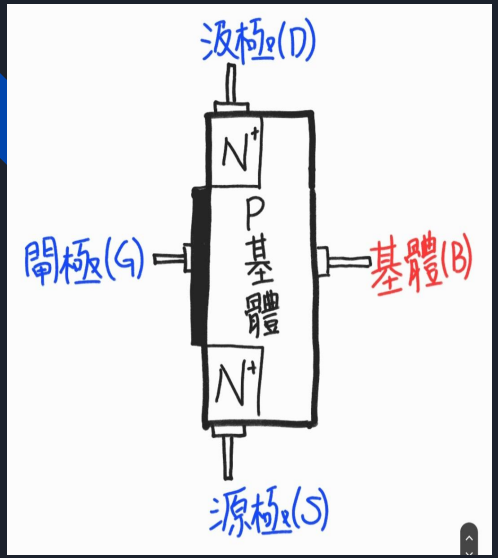


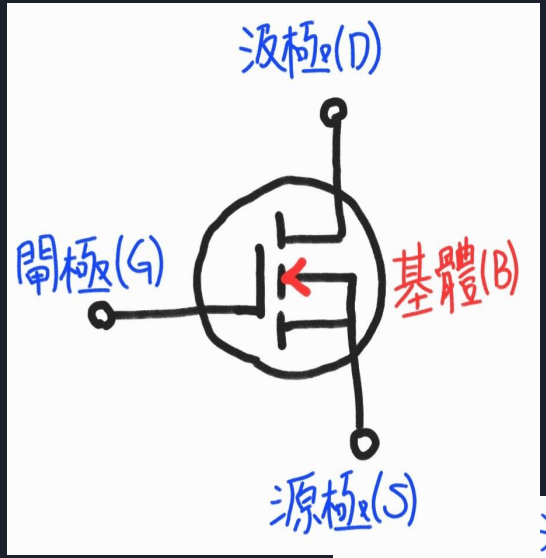
NCH D-MOSFET

PCH D-MOSFET



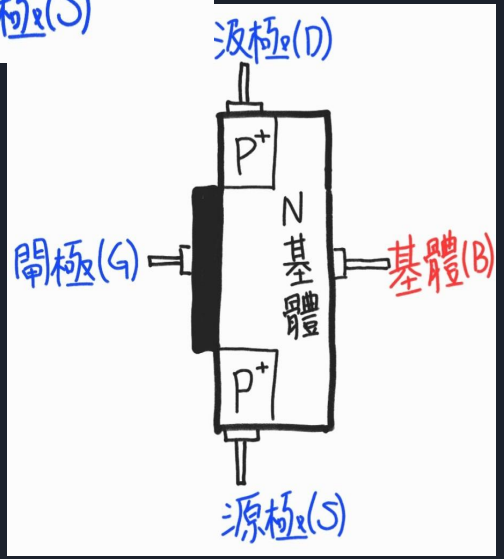


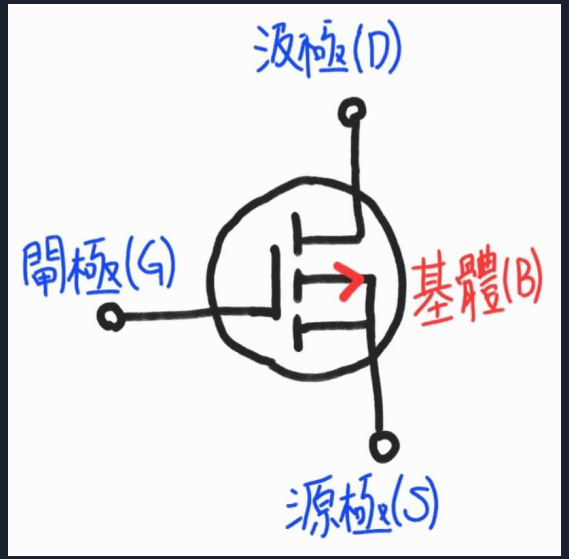




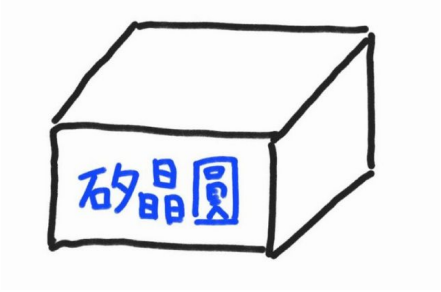
NCH E-MOSFET

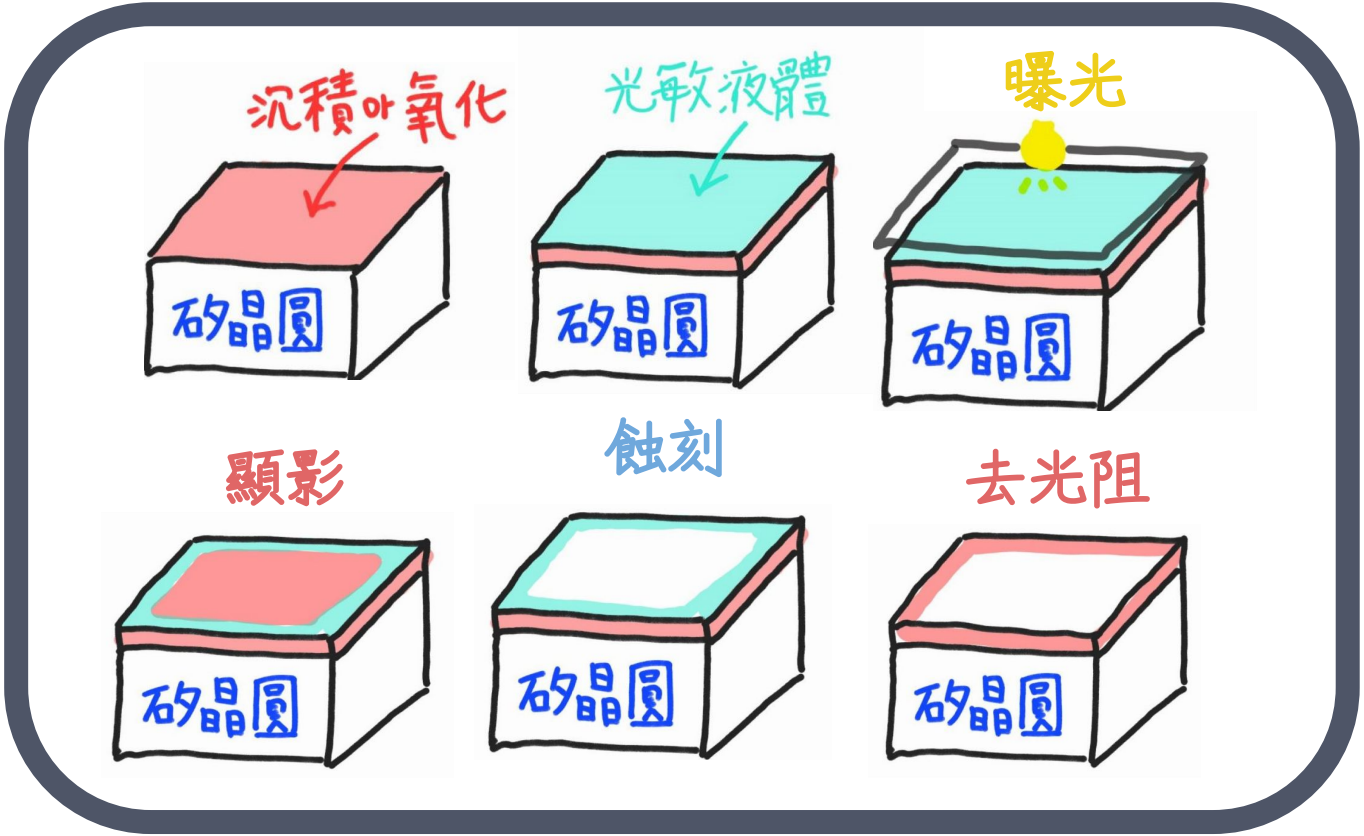
PCH E-MOSFET

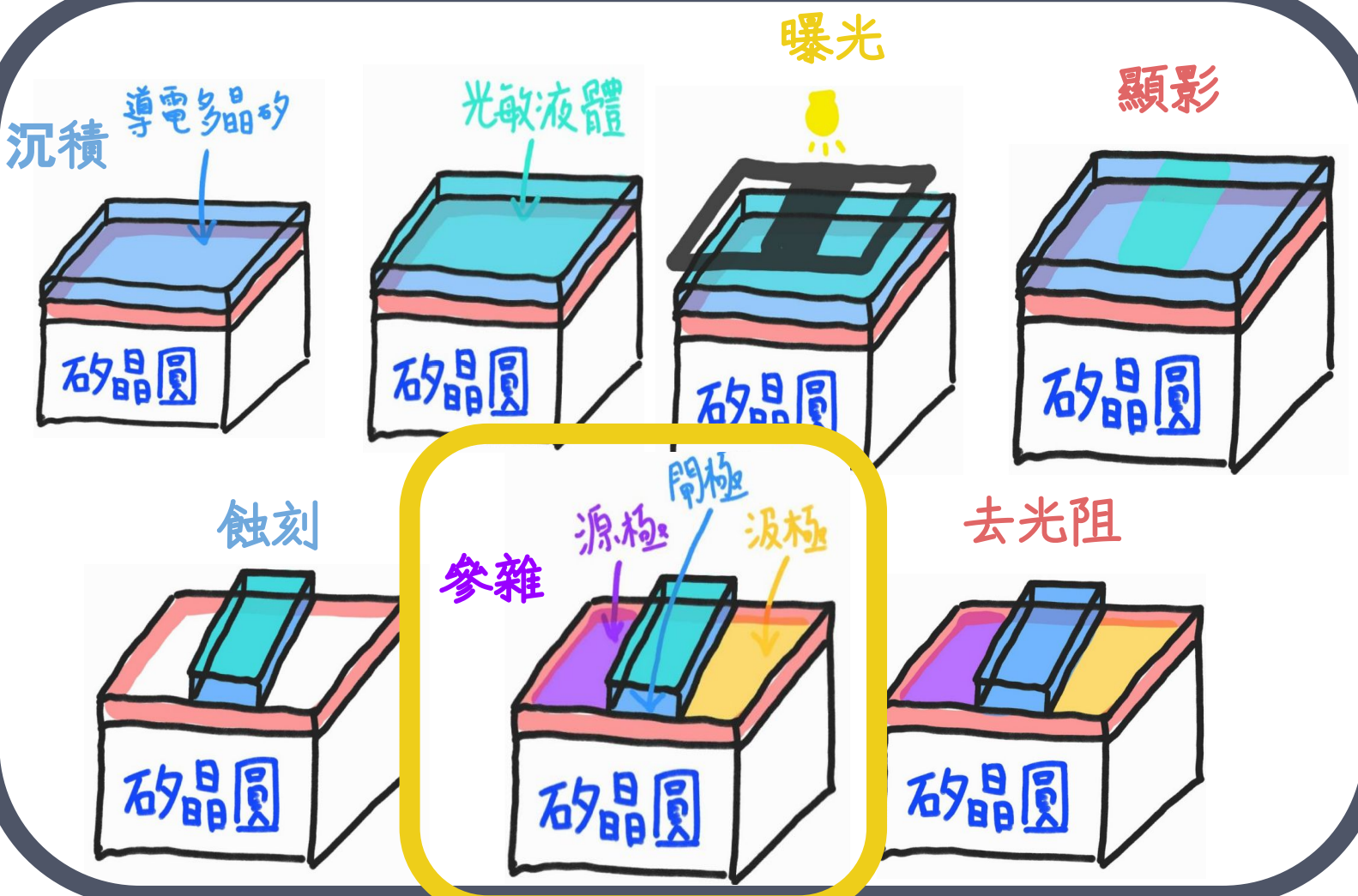


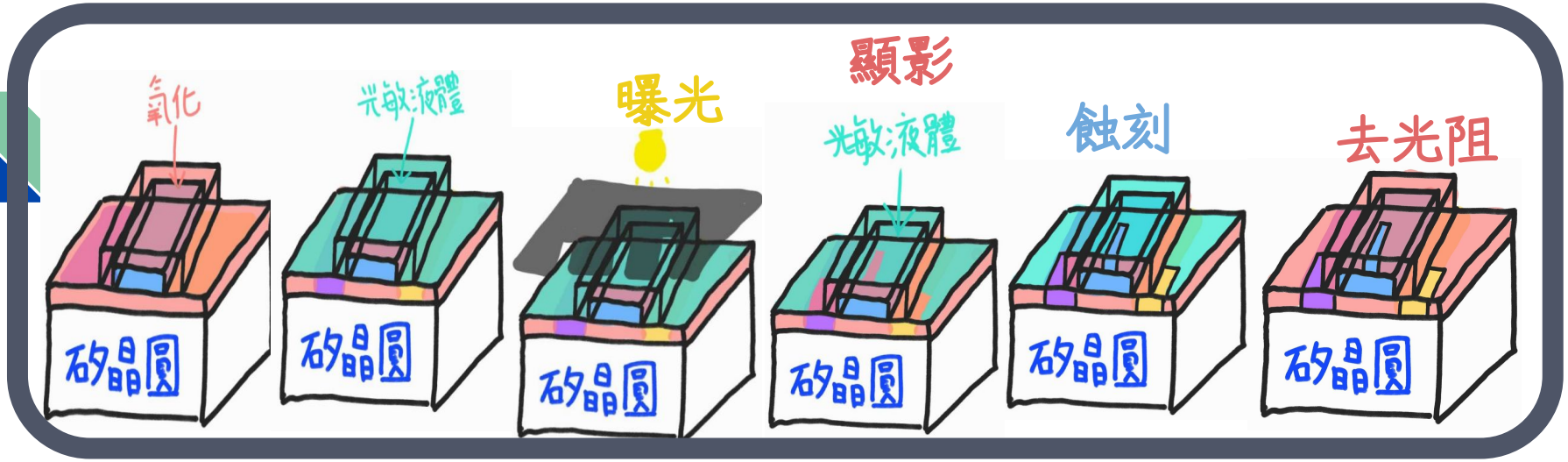


電晶體 製作






沉積
導電多晶矽
矽晶圓
光敏液體
矽晶圓
曝光
矽晶圓
顯影
矽晶圓
蝕刻
矽晶圓
參雜
閘極
源極
汲極
矽晶圓
去光阻
矽晶圓


氧化
矽晶圓
光敏液體
矽晶圓
曝光
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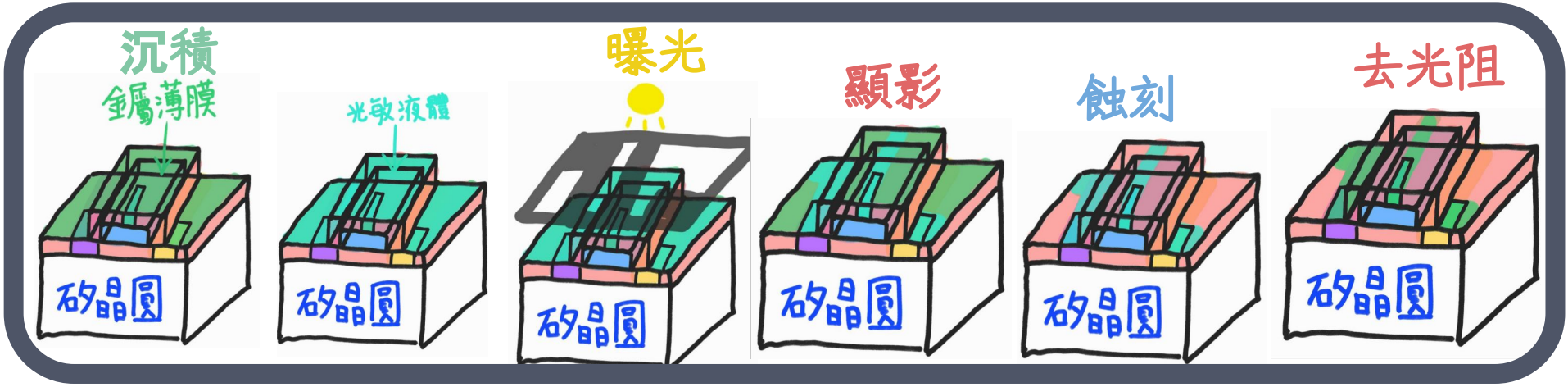
沉積
金屬薄膜
矽晶圓
光敏液體
矽晶圓
曝光
矽晶圓
顯影
矽晶圓
蝕刻
矽晶圓
去光阻
矽晶圓

場效電晶體 完成！