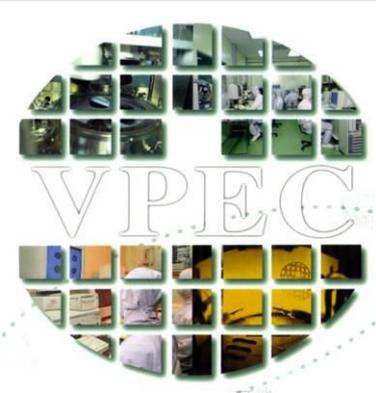




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# 公司簡介

## MOCVD 創造世界級之競爭力

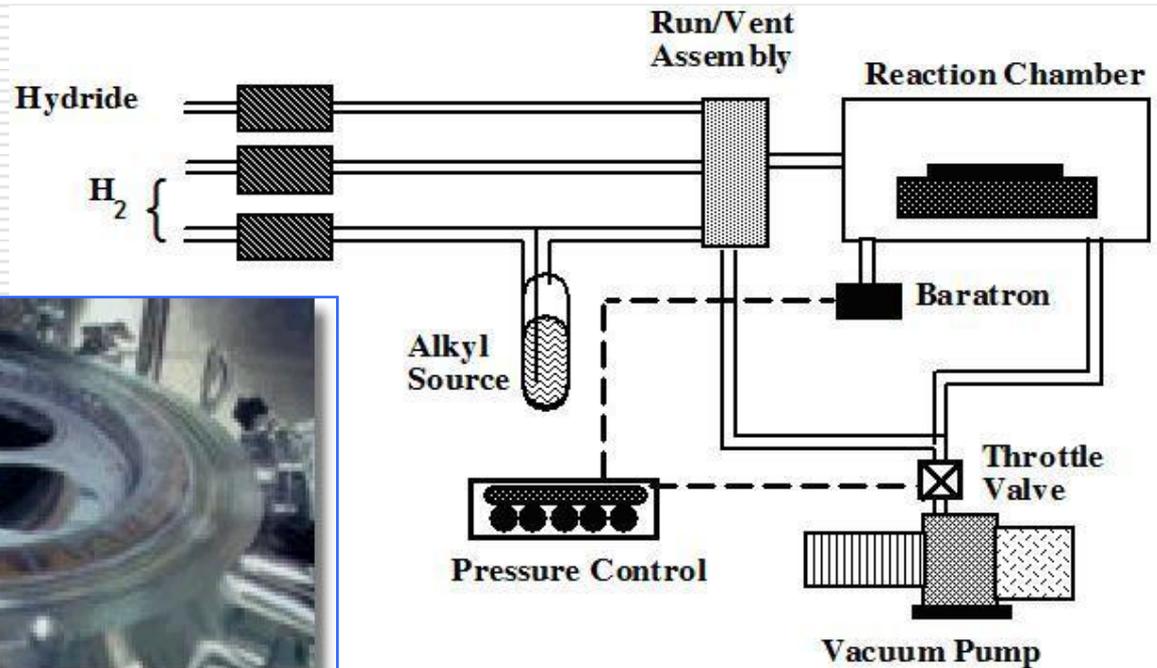




# 核心技术

## MOCVD (有機金屬氣相沉積法)

- Metal Organic Chemical Vapor Deposition





# 核心技術

生產  
機台

MOCVD有機金屬化學氣相沉積法  
Metal Organic Chemical Vapor Deposition

生產  
方式

透過有機金屬化學氣相沉積法，在基板上生長半導體薄膜的方式，同時透過機台即時監控，精確控制磊晶層，完成砷化鎵、磷化銦、氮化鎵等不同產品磊晶片生產。

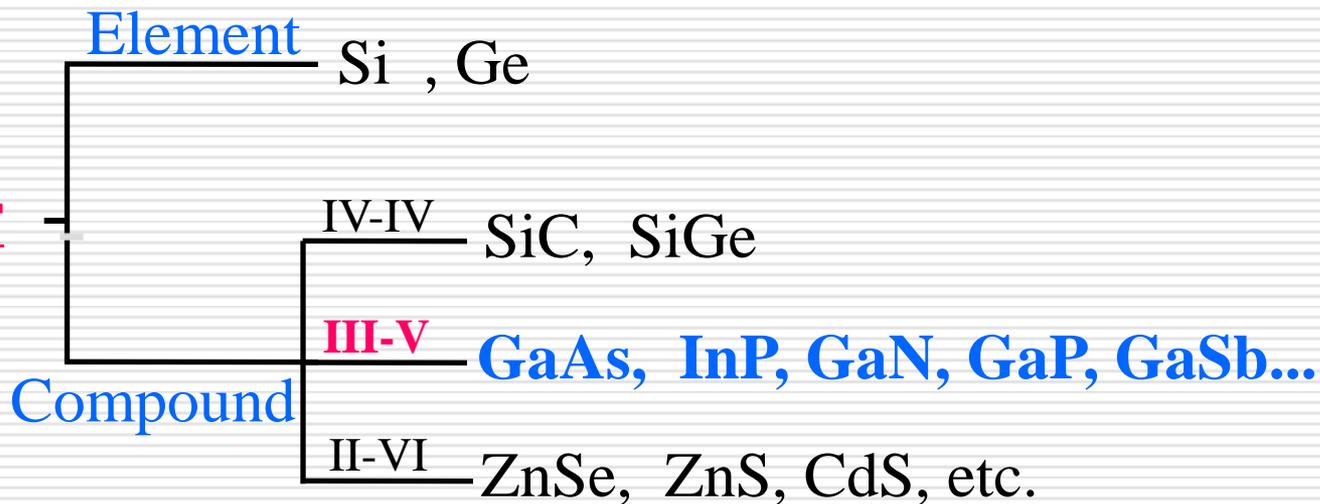
生產  
原理

磊晶層是由MOCVD在腔體中加熱基板，一個原子層，層層堆疊，行成磊晶層。



# 半導體分類 (依使用材料)

## Semiconductor



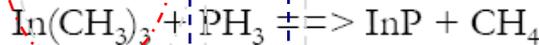
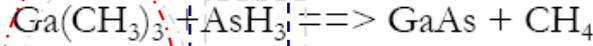
Period	Column II	III	IV	V	VI
2	Be 鈹 Beryllium	B 硼 Boron	C 碳 Carbon	N 氮 Nitrogen	O 氧 Oxygen
3	Mg 鎂 Magnesium	Al 鋁 Aluminum	Si 矽 Silicon	P 磷 Phosphorus	S 硫 Sulfur
4	Zn 鋅 Zinc	Ga 鎵 Gallium	Ge 鍺 Germanium	As 砷 Arsenic	Se 硒 Selenium
5	Cd 鎘 Cadmium	In 銦 Indium	Sn 錫 Tin	Sb 銻 Antimony	Te 碲 Tellurium
6	Hg 汞 Mercury	Tl 鉍 Thallium	Pb 鉛 Lead		

- 二元化合物 Binary : GaAs, InP, GaP, GaN, etc.
- 三元化合物 Ternary : InGaAs, InGaP, AlGaAs, etc.
- 四元化合物 Quaternary : AlGaInP, InGaAsP, etc.
- 五元化合物 Pentanary : AlGaInAsN, etc.



# 磊晶過程中之化學反應

化學反應式：



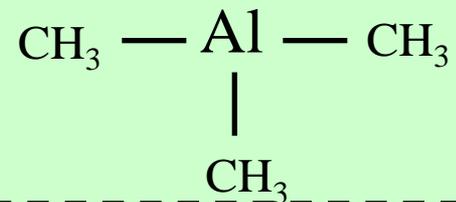
主要原物料：

**MO Source** + **Hydride** + Carrier Gas : **H2**

- TEAl : Tri-ethyl-Aluminum (  $\text{C}_2\text{H}_5$  )<sub>3</sub>Al
- TMGa : Tri-Methyl-Gallium (  $\text{CH}_3$  )<sub>3</sub> Ga
- TMIn : Tri-Methyl-Indium (  $\text{CH}_3$  )<sub>3</sub>In
- DETe : Di-ethyl-Tellurium (  $\text{C}_2\text{H}_5$  )<sub>2</sub>Te
- DEZn : Di-ethyl-Zinc (  $\text{C}_2\text{H}_5$  )<sub>2</sub>Zn
- CP<sub>2</sub>Mg : Bis (cyclo-penta-dienyl) -Magnesium 環戊二烯鎂

- AsH<sub>3</sub> : Arsine
- PH<sub>3</sub> : Phosphine
- SiH<sub>4</sub> : Silane
- Si<sub>2</sub>H<sub>6</sub> : Disilane
- H<sub>2</sub>Se : Hydrogen Selenide
- CB<sub>4</sub> : Carbon Tetrabromide

TMAI    Tri - Methyl - Aluminum (  $\text{CH}_3$  )<sub>3</sub>Al  
 三 甲 基                      鋁





# 化合物半導體材料特性

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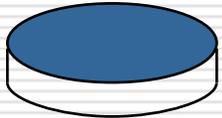
1. High Electron Mobility 高電子移動速率 (5.7x higher than CMOS)
  2. High Frequency Response 高頻率響應
  3. Wide Band Width 寬幅之頻寬
  4. High Linearity 高線性度
  5. High Power 高功率
  6. Alternative Choice of Material 材料選擇多元性
  7. 抗輻射
- 適用於無線通訊、光通訊、雷射



# 產業供應鏈

Sumitomo, Freiberg, AXT

2~6 "GaAs Substrate

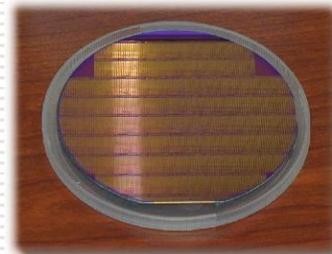


GaAs Epi- Wafer  
磊晶片



IDM : Qorvo, Avago,  
Skyworks

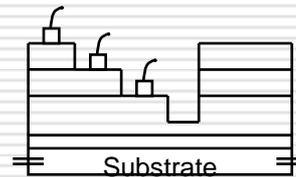
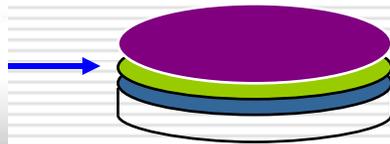
Microelectronics  
IC Process



Wireless  
Communication



MOCVD Reactor



Foundry :

WIN, AWSC,  
GCS



IC Package & Testing



# 2018年-2021年損益情形

	2021	%	2020	%	2019	%	2018	%
Revenue	3,608,521	100.00%	2,645,003	100.00%	2,530,909	100.00%	2,062,120	100.00%
Gross margin	1,519,713	42.11%	1,114,404	42.13%	1,034,272	40.87%	774,359	37.55%
Operating Profit	1,056,519	29.28%	687,515	25.99%	648,983	25.64%	463,906	22.50%
Financial Income	-3,842	-0.11%	-40,212	-1.52%	-20,380	-0.81%	25,273	1.23%
Tax	-197,596	-5.48%	-114,715	-4.34%	-114,278	-4.52%	-92,009	-4.46%
Net income	855,081	23.70%	532,588	20.14%	514,325	20.32%	397,170	19.26%
EPS	4.62		2.88		2.79		2.16	



# 2022 微電子產品 Outlook

### 5G Mobile Penetration



### WiFi6 / 6E



### IoT Smart Link



**Micro  
Electronics**

### V2X PA



### LEO Satellite



### 5G Base Station



### Military





# 2022 光電子產品 Outlook

Car LiDAR



AR / VR Sensing



Opto  
electron  
ics

Robot Vacuum Sense



Special Heat/IR Imaging



## AR / VR

Emitter: VCSEL  
Detector: PD  
Eye-safety

## Wireless

HBT (PA)  
pHEMT (Switch/LNA)  
WiFi 6/6E/7

**VPEC Proprietary and Confidential**



## LiDAR Turnkey Solution

Emitter: VCSEL, EEL  
Detector: PD, APD  
Eye-safety (1400nm ~ 1600nm)  
Long Range Detection (400m)

## V2X

HBT (PA)  
pHEMT (Switch/LNA)  
WiFi 6/6E/7

