



# 公司簡介

MOCVD創造世界級之競爭力

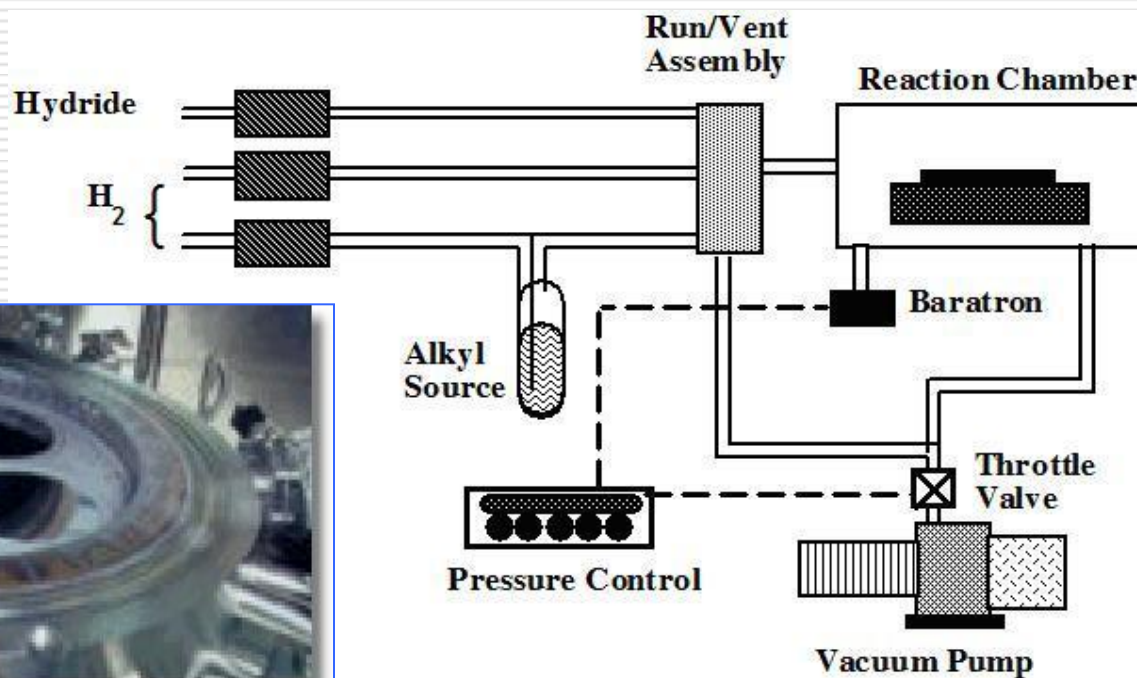




# 核心技術

## 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。

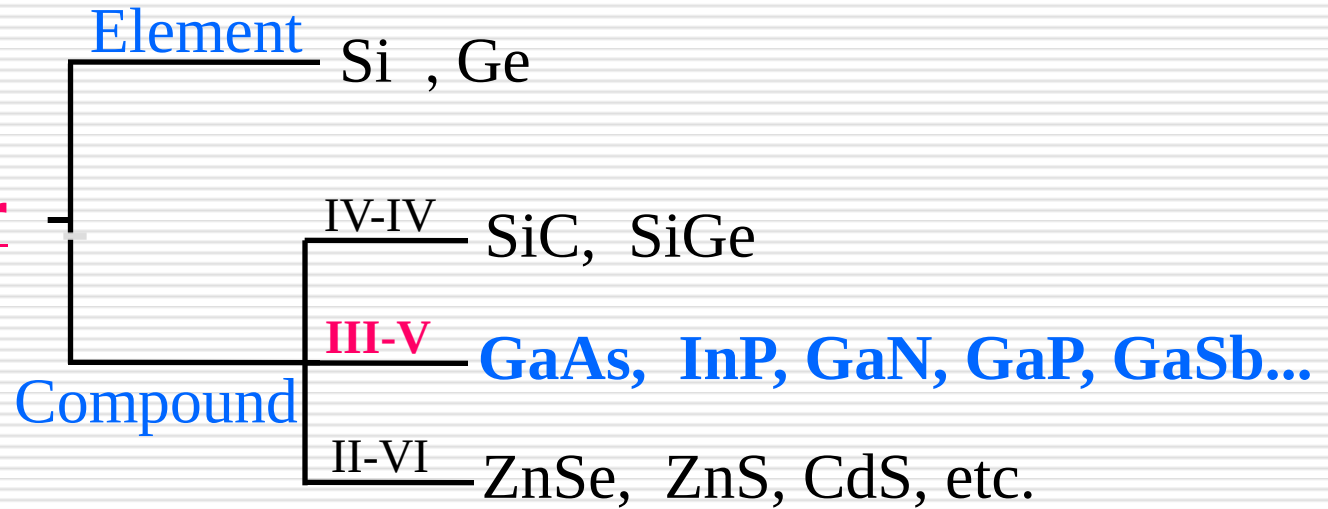
## 生產 原理

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

二元化合物 Binary : GaAs, InP, GaP, GaN, etc.

三元化合物 Ternary : InGaAs, InGaP, AlGaAs, etc.

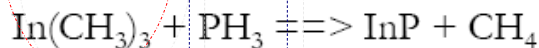
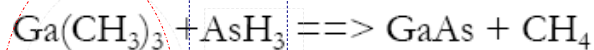
四元化合物 Quaternary : AlGaInP, InGaAsP, etc.

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：

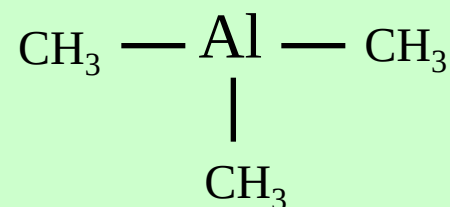
**MO Source** + **Hydride** + Carrier Gas : **H<sub>2</sub>**

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  
CBr<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

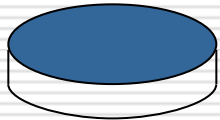
適用於無線通訊、光通訊、雷射



# 產業供應鏈

Sumitomo, Freiberg, AXT

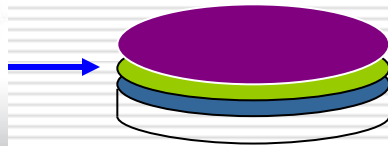
2~6 "GaAs Substrate



GaAs Epi- Wafer  
磊晶片

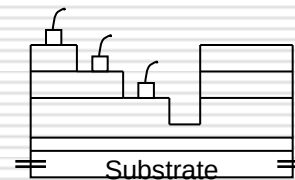
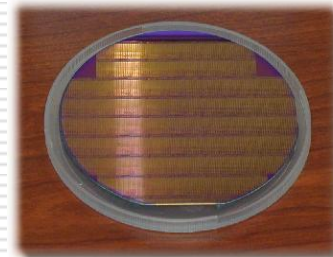


MOCVD Reactor



IDM : Qorvo, Avago,  
Skyworks

Microelectronics  
IC Process



Foundry :

WIN, AWSC,  
GCS



Wireless  
Communication



IC Package & Testing





# 2019年-2022年Q1損益情形

|                  | 2022Q1  | %       | 2021      | %       | 2020      | %       | 2019      | %       |
|------------------|---------|---------|-----------|---------|-----------|---------|-----------|---------|
| Revenue          | 839,197 | 100.00% | 3,608,521 | 100.00% | 2,645,003 | 100.00% | 2,530,909 | 100.00% |
| Gross margin     | 363,138 | 43.27%  | 1,519,713 | 42.11%  | 1,114,404 | 42.13%  | 1,034,272 | 40.87%  |
| Operating Profit | 244,584 | 29.15%  | 1,056,519 | 29.28%  | 687,515   | 25.99%  | 648,983   | 25.64%  |
| Financial Income | 27,843  | 3.32%   | -3,842    | -0.11%  | -40,212   | -1.52%  | -20,380   | -0.81%  |
| Tax              | -54,946 | -6.55%  | -197,596  | -5.48%  | -114,715  | -4.34%  | -114,278  | -4.52%  |
| Net income       | 217,481 | 25.92%  | 855,081   | 23.70%  | 532,588   | 20.14%  | 514,325   | 20.32%  |
| EPS              | 1.18    |         | 4.62      |         | 2.88      |         | 2.79      |         |





# 2022 微電子產品 Outlook

5G Mobile Penetration



WiFi6 / 6E



IoT Smart Link



**Micro  
Electron  
ics**

V2X PA



LEO Satellite



5G Base Station



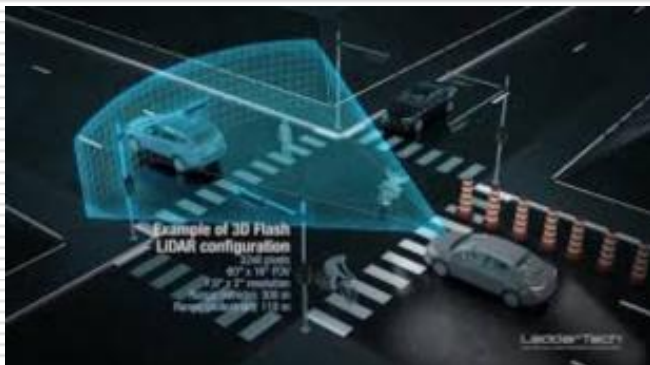
Military





# 2022 光電子產品 Outlook

Car LiDAR



AR / VR Sensing



Opto  
electron  
ics

Robot Vacuum Sense



Special Heat/IR Imaging



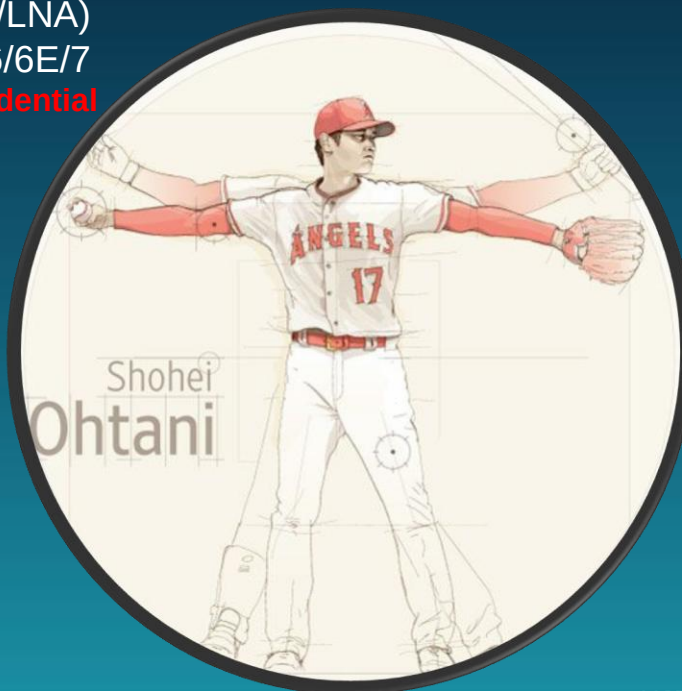
## AR / VR

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

