



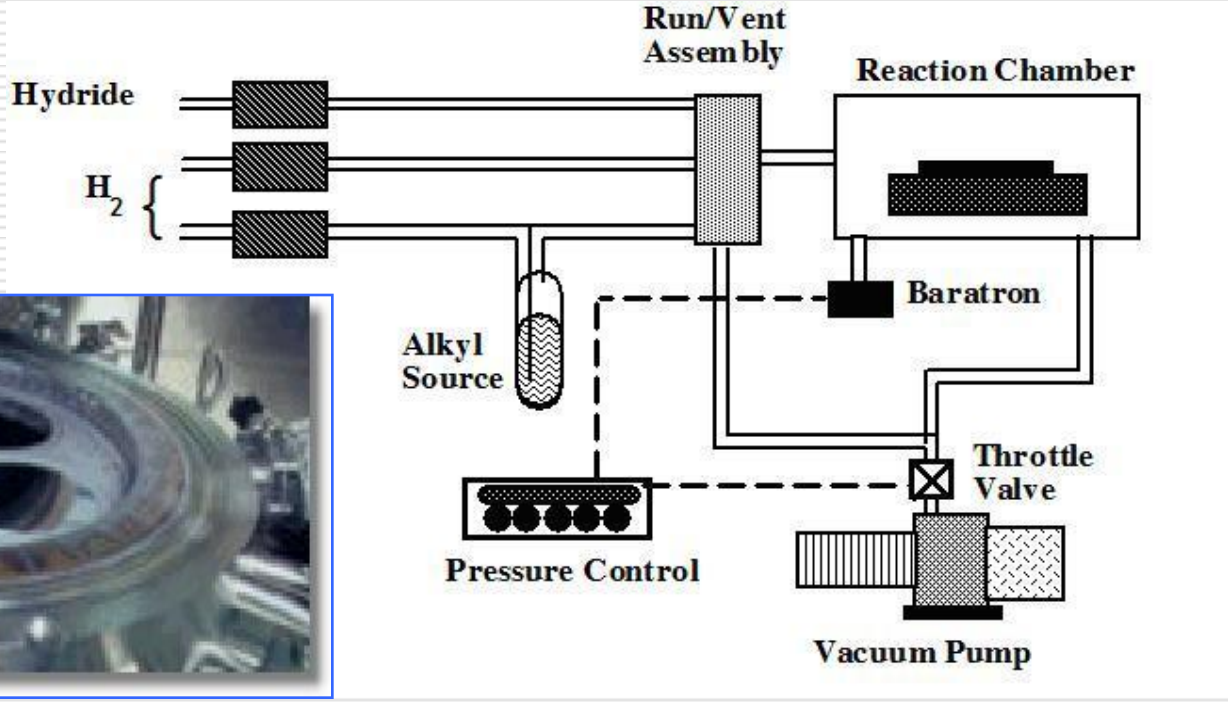
Company Profile

World-class leading edge with MOCVD

Core Technology

MOCVD（有機金屬氣相沉積法）

- Metal Organic Chemical Vapor Deposition



Core Technology

Production Reactor

MOCVD　Metal Organic Chemical Vapor Deposition

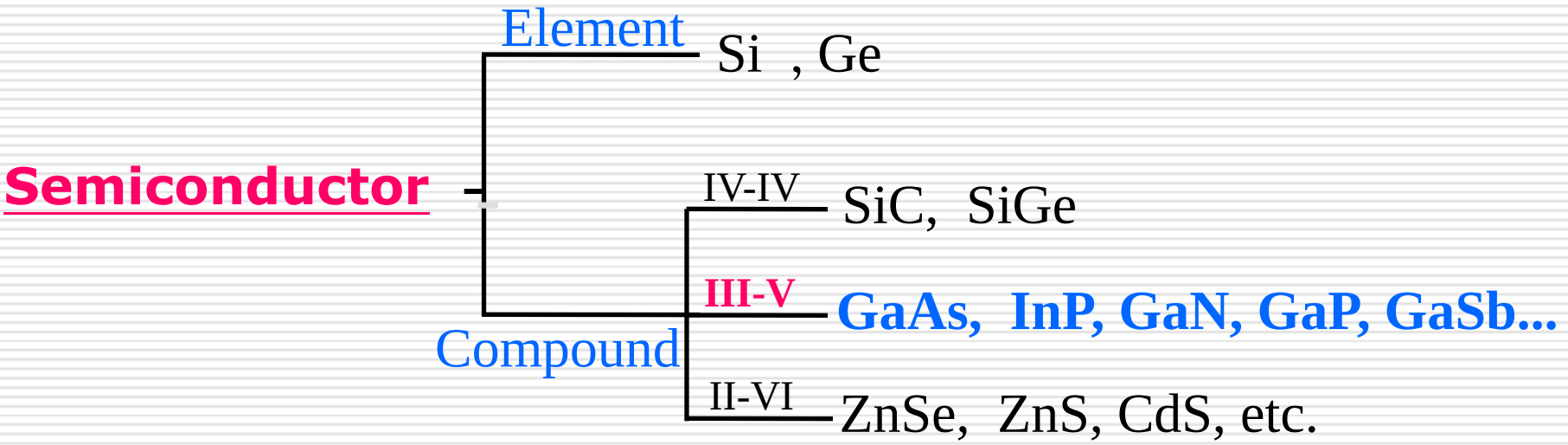
Way to Produce

Through the organic metal chemical vapor deposition method, the semiconductor film is grown on the substrate, and the epitaxial layer is accurately controlled through the real-time monitoring of the machine to complete the production of epitaxial wafers for different products such as GaAs 、 InP and GaN.

Production Principle

The epitaxial layer is heated by MOCVD in the cavity of the substrate, and an atomic layer is stacked layer by layer to form an epitaxial layer.

Semiconductor（by Material）



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 鉈 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.

Chemical Reaction During Epitaxy

化學反應式：

$Ga(CH_3)_3 + AsH_3 \Longrightarrow GaAs + CH_4$

$In(CH_3)_3 + PH_3 \Longrightarrow InP + CH_4$

主要原物料:

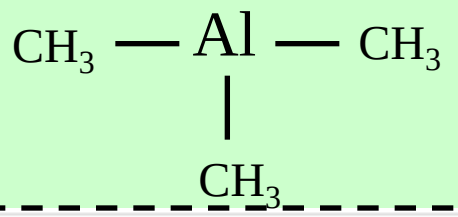
MO Source + **Hydride** + Carrier Gas：**H2**

TEAl : Tri-ethyl-Aluminum (C_2H5)$_3$Al
TMGa : Tri-Methyl-Gallium (CH_3)$_3$ Ga
TMIn : Tri-Methyl-Indium (CH3)$_3$In
DETe : Di-ethyl-Tellurium (C_2H5)$_2$Te
DEZn : Di-ethyl-Zinc (C_2H5)$_2$Zn
CP_2Mg : Bis (cyclo-penta-dienyl) Magnesium 環戊二烯鎂

AsH_3 : Arsine
PH_3 : Phosphine
SiH_4 : Silane
Si_2H_6 : Disiline
H_2Se : Hydrogen Selenide
CBr_4 : Carbon Tetrabromide

TMAl Tri - Methyl - Aluminum (CH_3)$_3$Al

三 甲基 鋁



Advantages of Compoundsemiconductor

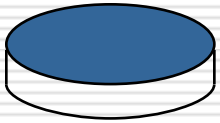
1. High Electron Mobility高電子移動速率(5.7x higher than CM0S)
2. High Frequency Response高頻率響應
3. Wide Band Width　寬幅之頻寬
4. High Linearity高線性度
5. High Power高功率
6. Alternative Choice of Material材料選擇多元性
7. 抗輻射

   適用於無線通訊、光通訊、雷射

GaAs in Wireless Communication Supply Chain

Sumitomo, Freiberg, AXT

2~6 ”GaAs Substrate



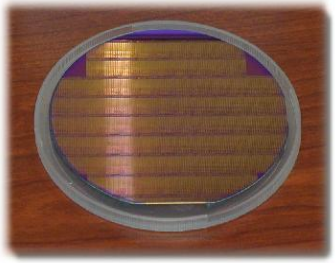
MOCVD Reactor

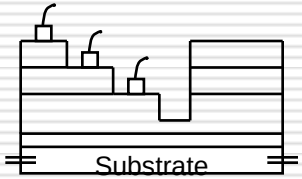
GaAs Epi- Wafer

磊晶片

IDM：Qorvo, Avago, Skyworks

Microelectronics IC Process





Foundry：WIN, AWSC, GCS

Wireless Communication

IC Package & Testing

2018-2021 Financial Result

	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 Outlook-Microelectronics

5G Mobile Penetration

WiFi6 / 6E

IoT Smart Link

Micro Electronics

V2X PA

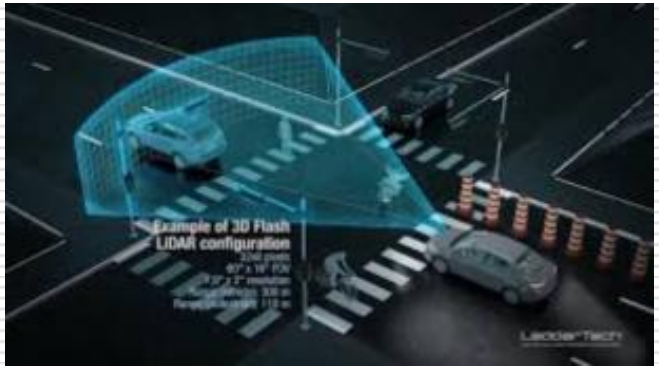
LEO Satellite

5G Base Station

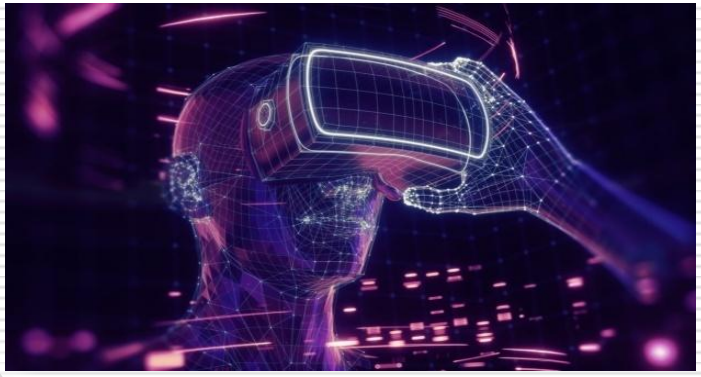
Military

2022 Outlook-Optoelectronics

Car LiDAR

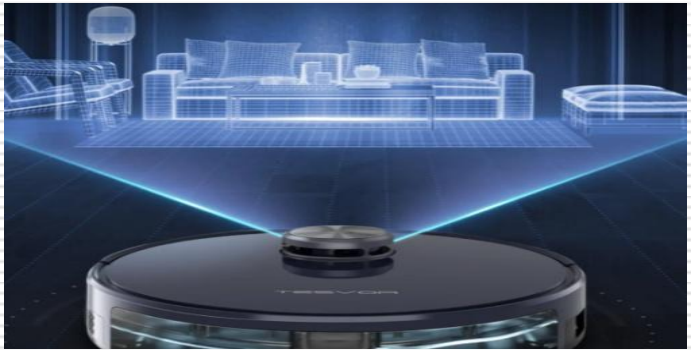


AR / VR Sensing



Opto electron ics

Robot Vacuum Sense



Special Heat/IR Imaging

AR / VR

Emitter: VCSEL
Detector: PD
Eye-safety

LiDAR Turnkey Solution

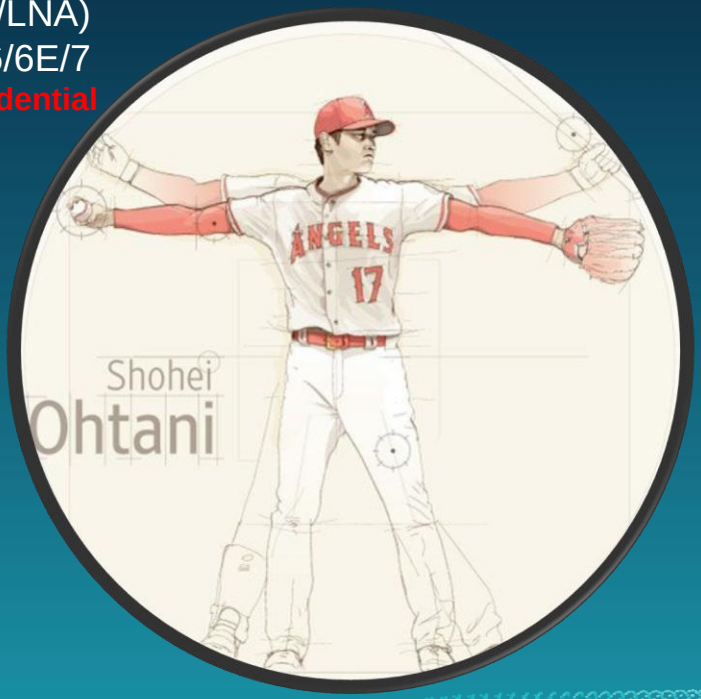
Emitter: VCSEL, EEL
Detector: PD, APD
Eye-safety (1400nm ~ 1600nm)
Long Range Detection (400m)

Wireless

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

V2X

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



Source: PYMNTS.com;
THE WALL STREET JOURNAL
groundtruthautonomy.com