

Semiconductor Precursors: Market Drivers, Supply Bottlenecks and Closing Gaps in the Value Chain

Dr. Peter Ludewig, Dockweiler Chemicals GmbH
RohstoffRadar - Germanium und Gallium:
Kleine Menge, große Wirkung | 28.08.2026



Dockweiler Chemicals

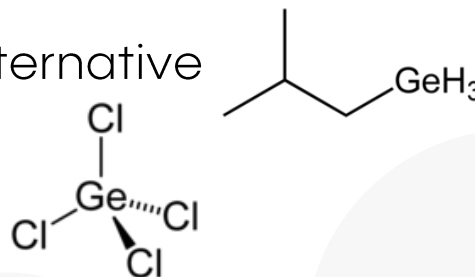
- High purity precursor chemicals for the semiconductor industry
- Synthesis - Purification - Filling - Cylinder services
- Portfolio with 100+ precursors covering almost all relevant elements
- Privately owned SME, ~80 employees
- Based in Marburg (Behringwerke)
- Supplying customers worldwide



Ga and Ge in semiconductor industries

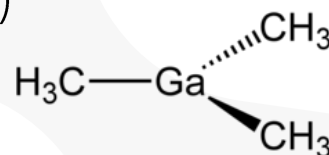
Silicon semiconductor industry:

- Si and SiGe: Logic and compute chips, Memory, Si-power devices
- Main Ge precursor: GeH₄ (gas, not supplied by Dock)
- Isobutylgermane: Low temperature alternative
- Germanium tetrachloride: Fiber optics



Compound semiconductor industry:

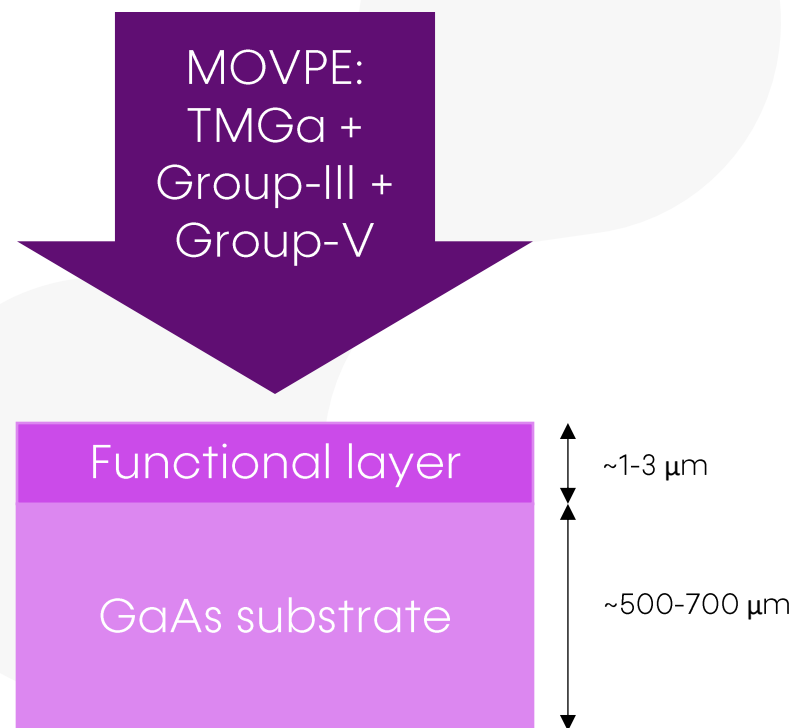
- GaAs, GaN & InP: Lasers, LEDs, Sensors, telecommunications, RF and radar, Power devices
- Strategically relevant for communications, defense and energy transition
- Main Ga precursor: Trimethylgallium (TMGa)



III	IV	V
5 B Boron 10.81	6 C Carbon 12.011	7 N Nitrogen 14.007
13 Al Aluminium 26.982	14 Si Silicon 28.085	15 P Phosphorus 30.974
31 Ga Gallium 69.723	32 Ge Germanium 72.630	33 As Arsenic 74.922
49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760
81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.980

From raw material to functional semiconductor layer

- Front end epi-wafer manufacturing:
 - Substrate Wafer: e.g. GaAs
 - + Functional layer via MOVPE (metal organic vapor phase epitaxy) with TMGa...
 - The functional layer is only a small fraction of the total wafer volume
- Raw material demand is largely driven by wafer manufacturing, not by the active layer

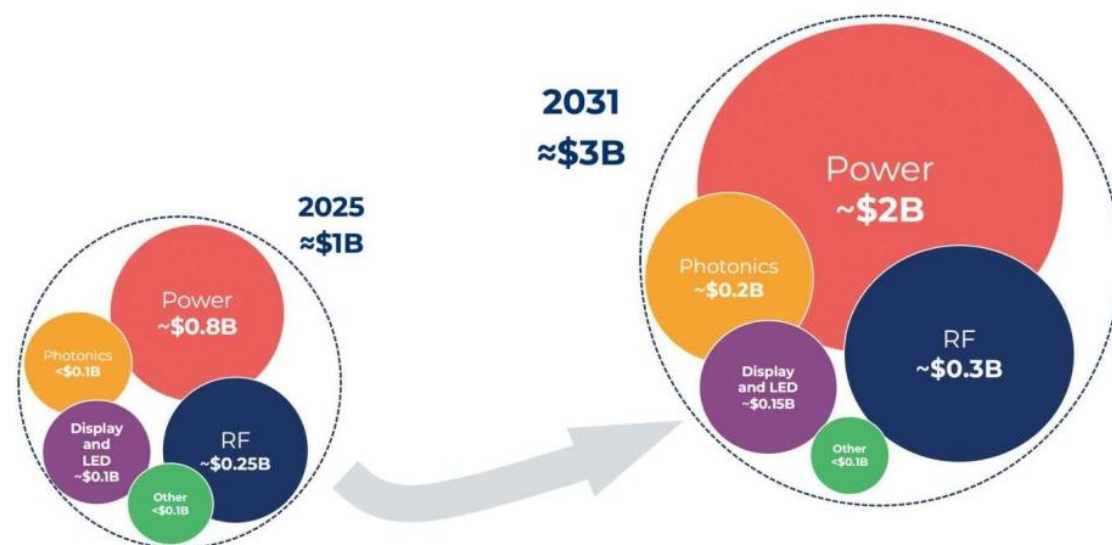


TMGa: Current market situation and outlook

- Current estimated European demand: 2-3 t*
- Yole: 14% CAGR for epi-wafer from 2025 to 2031
- Key growth drivers:
 - Power electronics (incl. AI data centers)
 - Optical data transmission (incl. AI data centers)
- Approximately 5–10 t between 2030 and 2040
- China/Asia with significantly higher demand (e.g. LED production, easier access to gallium)

COMPOUND SEMICONDUCTOR – SUBSTRATE MARKET (\$B)

Source: Status of the Compound Semiconductor Industry 2026 report, Yole Group

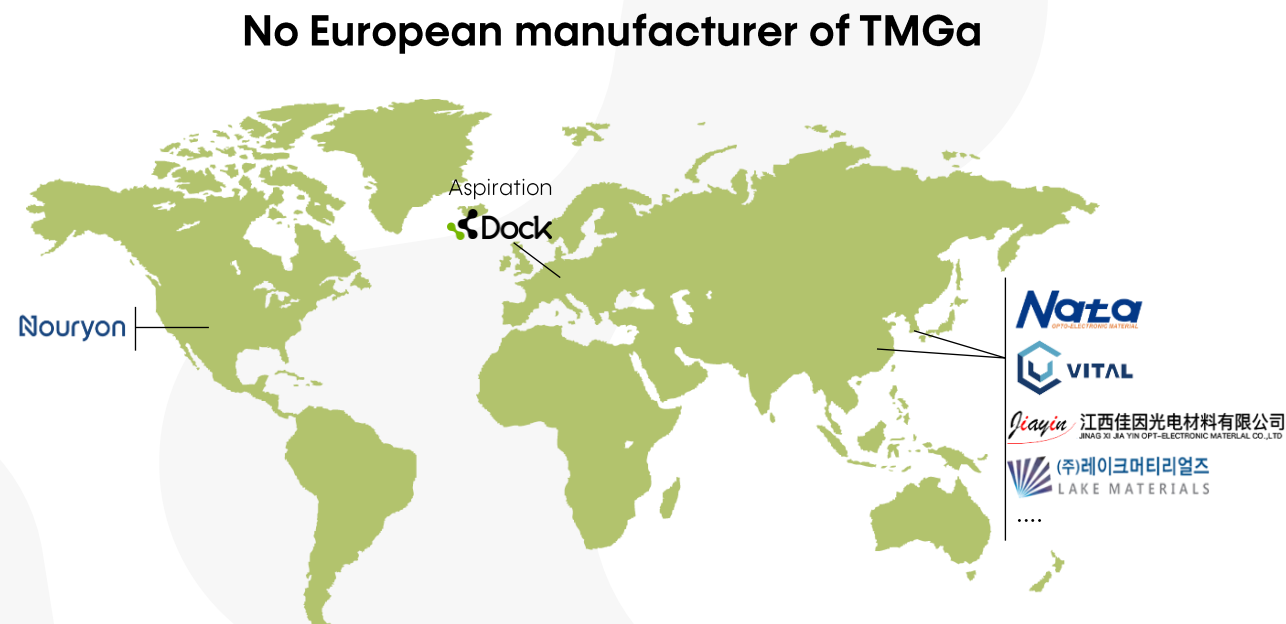


www.yolegroup.com | ©Yole Group 2026

https://compoundsemiconductor.net/article/123590/Compound_semis_enter_new_growth_phase?Yole

TMGa supply chain and challenges for european players

- Gallium production is concentrated almost exclusively in China
- TMGa production only in Asia (China, South Korea) and the United States (Nouryon)
- TMGa is pyrophoric, transport is limited to land and sea routes
- Lead times can extend to several months
- Cylinders must be returned, cleaned and prepared for reuse
- Recent disruptions: Corona pandemic, Chinese export restrictions, war in middle east



Dock's role: from secure supply today to European capacity tomorrow

- Current activities:
 - Sourcing of TMGa in larger batches
 - Quality control and cylinder service
 - Secure supply of western customers
- Future perspective:
 - Dock has applied for funding under the European Chips Act
 - Production facility for critical semiconductor precursors
 - Potential TMGa capacity of up to 5 t
- Raw material supply chain:
 - Recycling streams: EU founded Closer Project
 - Western mines: USA/Canada, Greece



Projekt SUPREME
(Sustainable Precursors for Europe's
Microelectronics Excellence)



Thank you for your attention!

Dockweiler Chemicals GmbH
Emil-von-Behring-Strasse 76
Goerzhaeuser Hof M217
35041 Marburg, Germany

T +49 (0)6421 39-6380
F +49 (0)6421 39-6381
sales@dockchemicals.com

dockchemicals.com

© Dockweiler Chemicals GmbH

