



## **III-V Compound Semiconductors: Integration with Silicon-Based Microelectronics**

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## III-V Compound Semiconductors: Integration with Silicon-Based Microelectronics

Silicon-based microelectronics has steadily improved in various performance-to-cost metrics. But after decades of processor scaling, fundamental limitations and considerable new challenges have emerged. The integration of compound semiconductors is the leading candidate to address many of these issues and to continue the relentless pursuit of more powerful, cost-effective processors.

**III-V Compound Semiconductors: Integration with Silicon-Based Microelectronics** covers recent progress in this area, addressing the two major revolutions occurring in the semiconductor industry: integration of compound semiconductors into Si microelectronics, and their fabrication on large-area Si substrates. The authors present a scientific and technological exploration of GaN, GaAs, and III-V compound semiconductor devices within Si microelectronics, building a fundamental foundation to help readers deal with relevant design and application issues.

### ***Explores silicon-based CMOS applications developed within the cutting-edge DARPA program***

Providing an overview of systems, devices, and their component materials, this book:

- Describes structure, phase diagrams, and physical and chemical properties of III-V and Si materials, as well as integration challenges
- Focuses on the key merits of GaN, including its importance in commercializing a new class of power diodes and transistors
- Analyzes more traditional III-V materials, discussing their merits and drawbacks for device integration with Si microelectronics
- Elucidates properties of III-V semiconductors and describes approaches to evaluate and characterize their attributes
- Introduces novel technologies for the measurement and evaluation of material quality and device properties
- Investigates state-of-the-art optical devices, LEDs, Si photonics, high-speed, high-power III-V materials and devices, III-V solar cell devices, and more

Assembling the work of renowned experts, this is a reference for scientists and engineers working at the intersection of Si and compound semiconductor technology. Its comprehensive coverage is valuable for both students and experts in this burgeoning field.

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