1. Record Nr. UNINA9910972318803321

Titolo	III-V compound semiconductors : integration with silicon-based microelectronics / / edited by Tingkai Li, Michael Mastro, Armin Dadgar
Pubbl/distr/stampa	Boca Raton, : CRC Press, 2010
ISBN	1-04-022015-0 0-429-19162-6 1-4398-1523-2
Edizione	[First edition.]
Descrizione fisica	1 online resource (588 p.)
Altri autori (Persone)	LiTingkai MastroMichael A. <1975-> DadgarArmin
Disciplina	621.3815/2
Soggetti	Compound semiconductors Electronics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front cover; Contents; Preface; Contributors; Part I. Technical Fundamentals and Challenges; Chapter 1. Fundamentals and the Future of Semiconductor Device Technology; Chapter 2. Challenge of III-V Materials Integration with Si Microelectronics; Chapter 3. III-Nitrides on Si Substrates; Chapter 4. New Technology Approaches; Chapter 5. Group III-A Nitrides on Si: Stress and Microstructural Evolution; Chapter 6. Direct Growth of III-V Devices on Silicon; Chapter 7. Optoelectronic Devices Integrated on Si; Chapter 8. Reliability of III-V Electronic Devices Chapter 9. In Situ Curvature Measurements, Strains ,and Stresses in the Case of Large Wafer Bending and Multilayer SystemsChapter 10. X-Ray Characterization of Group III-Nitrides; Chapter 11. Luminescence in GaN; Chapter 12. GaN-Based Optical Devices on Silicon; Chapter 13. Conventional III-V Materials and Devices on Silicon; Chapter 14. III-V Solar Cells on Silicon; Back cover
Sommario/riassunto	"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 programProviding 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 challengesFocuses 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 microelectronicsElucidates properties of III-V semiconductors and describes approaches to evaluate and characterize their attributesIntroduces novel technologies for the measurement and evaluation of material quality and device propertiesInvestigates state-of-the-art optical devices, LEDs, Si photonics, high-speed, high-power III-V materials and devices, III-V solar cell devices, and moreAssembling 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."--Provided by publisher.