

1. Record Nr.	UNINA9910830215703321
Titolo	LEDs for lighting applications [[electronic resource] /] / edited by Patrick Mottier
Pubbl/distr/stampa	London, : ISTE Hoboken, NJ, : Wiley, c2009
ISBN	1-282-68721-2 9786612687211 1-118-21168-5 0-470-61201-0 0-470-61029-8
Descrizione fisica	1 online resource (298 p.)
Collana	ISTE ; ; v.134
Altri autori (Persone)	MottierPatrick
Disciplina	621.3815/22 621.381522
Soggetti	Light emitting diodes Electric lighting - Equipment and supplies
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	LEDs for Lighting Applications; Table of Contents; Foreword; Introduction; Chapter 1. Light-Emitting Diodes: Principles and Challenges; 1.1. History of a revolution in the world of the light sources; 1.2. LEDs and lighting; 1.3. Principle of operation, color, efficiency, lifetime and quality of LEDs; 1.3.1. White light production from LEDs: principles and challenges; 1.3.2. Lifetime; 1.3.3. Quality of LEDs; 1.4. Challenges facing LEDs; 1.5. Bibliography; Chapter 2. Substrates for III-Nitride-based Electroluminescent Diodes; 2.1. Introduction 2.2. Crystal structure and epitaxial relation with 6H-SiC and Al ₂ O ₃ ; 2.3. Defects and constraints due to heteroepitaxy; 2.3.1. Dislocations; 2.3.2. Disorientation of the substrate; 2.3.3. Epitaxial stress; 2.3.4. Thermal stress; 2.4. MOVPE growth of GaN on sapphire; 2.4.1. GaN growth; 2.4.2. Standard 2D epitaxy; 2.4.3. 3D epitaxial growth; 2.4.4. Epitaxial lateral overgrowth (ELO 1S); 2.4.5. Anisotropic growth; 2.4.6. Two stage ELO GaN growth (ELO 2S); 2.4.7. GaN growth using pendeo-

epitaxy; 2.4.8. Nano epitaxy; 2.5. Bulk nitride substrates
2.5.1. HNPS (high nitrogen pressure solution method) for the
fabrication of crystalline GaN; 2.5.2. Ammonothermal synthesis of GaN;
2.5.3. Halide vapor phase epitaxy (HVPE) of GaN; 2.6. Conclusion; 2.7.
Bibliography; Chapter 3. III-Nitride High-Brightness Light-Emitting
Diodes; 3.1. Introduction; 3.2. p-n junction in GaN; 3.3. Active region:
InGaN/GaN quantum well; 3.3.1. Growth and structure; 3.3.2. Optical
properties; 3.4. Radiative efficiency; 3.5. Conclusion and prospects;
3.6. Bibliography; Chapter 4. Diode Processing; 4.1. Introduction; 4.2.
Orders of magnitude; 4.3. Diode configurations
4.3.1. Conventional chip (CC); 4.3.2. Flip chip (FC); 4.3.3. Vertical thin
film (VTF); 4.3.4. Thin film flip chip (TFFC); 4.4. Light extraction at
wafer level; 4.5. Diode processing, etching, contact deposition; 4.5.1.
N-type contacts; 4.5.2. P-type contacts; 4.6. Etching; 4.7. Substrate
removal; 4.8. Potential evolutions; 4.9. Bibliography; Chapter 5.
Packaging; 5.1. Introduction; 5.2. Different packaging processes; 5.2.1.
Historical background; 5.2.2. From the wafer to the chip; 5.2.3.
Components with connection pins; 5.2.4. SMT leadform components;
5.2.5. SMT "leadless" components
5.2.6. Other technologies; 5.2.7. Conclusion; 5.3. Thermal management;
5.3.1. Motivations; 5.3.2. Heat dissipation modes; 5.3.3. Thermal
dissipation in LEDs; 5.3.4. Comparison of different packaging
processes; 5.3.5. Conclusion; 5.4. Light extraction in LEDs; 5.4.1.
Lateral light extraction in LEDs; 5.4.2. Vertical light extraction through
a lens; 5.4.3. Lens/encapsulant materials; 5.4.4. Lenses and
encapsulant implementation; 5.5. LED component characteristics;
5.5.1. Thermal and electrical characteristics; 5.5.2. Optical
characteristics; 5.5.3. Binning; 5.5.4. Reliability
5.6. Conclusion and trends

Sommario/riassunto

Light Emitting Diodes (LEDs) are no longer confined to use in commercial signage and have now moved firmly, and with unquestioned advantages, into the field of commercial and domestic lighting. This development was prompted in the late 1980s by the invention of the blue LED, a wavelength that had previously been missing from the available LED spectrum and which opened the way to providing white light. Since that point, LED performance (including energy efficiency) has improved dramatically, and now compares with the performance of fluorescent lights - and there remain further performance impro
