1. Record Nr. UNINA9910140497803321

Titolo	LED lighting : technology and perception / / edited by Tran Quoc Khanh [and three others]
Pubbl/distr/stampa	Weinheim, Germany : , : Wiley-VCH Verlag GmbH & Company KGaA, , [2015] ©2015
ISBN	3-527-67016-5 3-527-67014-9 3-527-67017-3
Descrizione fisica	1 online resource (517 p.)
Disciplina	620.11295
Soggetti	Light emitting diodes
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	LED Lighting; Foreword; Contents; Table of the Coauthors; Preface; Chapter 1 Introduction; Reference; Chapter 2 The Human Visual System and Its Modeling for Lighting Engineering; 2.1 Visual System Basics; 2.1.1 The Way of Visual Information; 2.1.2 Perception; 2.1.3 Structure of the Human Eye; 2.1.4 The Pupil; 2.1.5 Accommodation; 2.1.6 The Retina; 2.1.7 Cone Mosaic and Spectral Sensitivities; 2.1.8 Receptive Fields and Spatial Vision; 2.2 Radiometry and Photometry; 2.2.1 Radiant Power (Radiant Flux) and Luminous Flux; 2.2.2 Irradiance and Illuminance 2.2.3 Radiant Intensity and Luminous Intensity 2.2.4 Radiance and Luminance; 2.2.5 Degrees of Efficiency for Electric Light Sources; 2.3 Colorimetry and Color Science; 2.3.1 Color Matching Functions and Tristimulus Values; 2.3.2 Color Appearance, Chromatic Adaptation, Color Spaces, and Color Appearance Models; 2.3.2.1 Perceived Attributes of Color Perception; 2.3.2.2 Chromatic Adaptation; 2.3.2.3 CIELAB Color Space; 2.3.2.4 The CIECAM02 Color Appearance Model; 2.3.3 Modeling of Color Difference Perception; 2.3.3.1 MacAdam Ellipses; 2.3.3.2 u', v' Chromaticity Diagram 2.3.3.3 CIELAB Color Difference 2.3.3.4 CAM02-UCS Uniform Color Space and Color Difference; 2.3.4 Blackbody Radiators and Phases of

Daylight in the x, y Chromaticity Diagram; 2.4 LED Specific Spectral and Colorimetric Quantities; 2.4.1 Peak Wavelength (P); 2.4.2 Spectral Bandwidth at Half Intensity Level (0.5); 2.4.3 Centroid Wavelength (C); 2.4.4 Colorimetric Quantities Derived from the Spectral Radiance Distribution of the LED Light Source; 2.4.4.1 Dominant Wavelength (D); 2.4.4.2 Colorimetric Purity (pC); 2.5 Circadian Effect of Electromagnetic Radiation
2.5.1 The Human Circadian Clock References; Chapter 3 LED Components - Principles of Radiation Generation and Packaging; 3.1 Introduction to LED Technology; 3.2 Basic Knowledge on Color Semiconductor LEDs; 3.2.1 Injection Luminescence; 3.2.2 Homo-Junction, Hetero-Junction, and Quantum Well; 3.2.2.1 Homo-Junction; 3.2.2.2 Hetero-Junction; 3.2.2.3 Quantum Well; 3.2.3 Recombination; 3.2.3.1 Direct and Indirect Recombination; 3.2.3.2 Radiative and Nonradiative Recombinations and Their Simple Theoretical Quantification; 3.2.4 Efficiency; 3.2.4.1 Internal Quantum Efficiency (i) 3.2.4.2 Injection Efficiency (inj) 3.2.4.3 Light Extraction Efficiency (extraction); 3.2.4.4 External Quantum Efficiency (ext); 3.2.4.5 Radiant Efficiency (e, See Section 2.2.5, Eq. (2.13)); 3.2.4.6 Luminous Efficacy (v); 3.2.5 Semiconductor Material Systems - Efficiency, Possibilities, and Limits; 3.2.5.1 Possible Semiconductor Systems; 3.2.5.2 Semiconductor Systems for Amber-Red Semiconductor LEDs; 3.2.5.3 Semiconductor Systems for UV-Blue-Green Semiconductor LEDs; 3.2.5.4 The Green Efficiency Gap of Color Semiconductor LEDs; 3.3 Color Semiconductor LEDs
3.3.1 Concepts of Matter Waves of de Broglie

Sommario/riassunto

Promoting the design, application and evaluation of visually and electrically effective LED light sources and luminaires for general indoor lighting as well as outdoor and vehicle lighting, this book combines the knowledge of LED lighting technology with human perceptual aspects for lighting scientists and engineers. After an introduction to the human visual system and current radiometry, photometry and color science, the basics of LED chip and phosphor technology are described followed by specific issues of LED radiometry and the optical, thermal and electric modeling of LEDs. This is supplement