3D printing of optical components /

Heinrich, Andreas,
editor

Springer,
2021

Electronic books

Monografía

This edited volume reviews the current state of the art in the additive manufacturing of optical componentry, exploring key principles, materials, processes and applications. A short introduction lets readers familiarize themselves with the fundamental principles of the 3D printing method. This is followed by a chapter on commonly-used and emerging materials for printing of optical components, and subsequent chapters are dedicated to specific topics and case studies. The high potential of additive manufactured optical components is presented based on different manufacturing techniques and accompanied with extensive examples from nanooptics to large scale optics and taking research and industrial perspectives. Readers are provided with an extensive overview of the new possibilities brought about by this alternative method for optical components manufacture. Finally, the limitations of the method with respect to manufacturing techniques, materials and optical properties of the generated objects are discussed. With contributions from experts in academia and industry, this work will appeal to a wide readership, from undergraduate students through engineers to researchers interested in modern methods of manufacturing optical components

Título: 3D printing of optical components Andreas Heinrich, editor

Editorial: Cham, Switzerland Springer 2021

Descripción física: 1 online resource

Mención de serie: Springer Series in Optical Sciences v.233

Bibliografía: Includes bibliographical references

Lamination (SDL) -- 1.2.5.1 Pros and Cons -- 1.2.5.2 Machines and Manufacturers -- 1.3 Processing Materials -- 1.4 Characteristics of Additive Manufactured Parts -- References -- Chapter 2: Selective Laser Melting of Reflective Optics -- 2.1 Adjusting Optics Manufacturing -- 2.2 Requirements for Reflective Optics -- 2.2.1 Applications for Reflective Optics -- 2.2.2 Geometry -- 2.2.3 Relation Between Design Parameters and Functionality 2.2.4 Reflector Design for Additive Manufacturing -- 2.3 Additive Manufacturing: Selective Laser Melting -- 2.4 Additive Manufacturing of a Reflector Array -- 2.4.1 Design of a Reflector Array -- 2.4.2 Validation of a Process Configurator -- 2.5 Challenges for SLM of Reflective Optics -- References -- Chapter 3: 3D Printing of Optics Based on Conventional Printing Technologies -- 3.1 Introduction -- 3.2 Materials Used for the Additive Manufacturing of Optics Using Polymerization -- 3.2.1 Photopolymerization Categorized According to the Reacting Species -- 3.2.1.1 Radical Photopolymerization 3.2.1.2 Cationic and Anionic Photopolymerization -- 3.2.2 Resin Composition -- 3.2.2.1 Photoinitiators -- 3.2.2.2 Prepolymers -- 3.2.2.3 Reactive Diluents -- 3.2.2.4 Other Optional Additives -- 3.3 Analysis of Additively Manufactured Optics -- 3.3.1 Analysis of the Printing Process -- 3.3.2 Analysis of the Shape and Surface of Additively Manufactured Optics -- 3.3.3 Dip Coating to Improve the Surface of Additively Manufactured Optical Elements -- 3.3.4 Analysis of the Optical Properties of Additively Manufactured Elements -- 3.4 Additively Manufactured Macroscopic Optics 3.4.1 Light-Guiding Elements -- 3.4.1.1 Complex Light-Guiding Structures -- 3.4.1.2 Additively Manufactured Scattered Light Sensor for Quality Control -- 3.4.2 Lens Systems -- 3.4.2.1 Additively Manufactured Doublet -- 3.4.2.2 Refractive Panoramic Lens -- 3.4.3 Liquid Lenses -- 3.4.4 Freeform Lenses -- 3.4.4.1 Definition of Freeform Optics -- 3.4.4.2 Applications of Freeform Optics -- 3.4.4.3 Computation of Freeform Lenses -- 3.4.4.4 Additive Manufacturing of Transmissive Freeform Elements -- 3.4.5 Volumetric Displays Using Additive Manufacturing Processes

Copyright/Depósito Legal: 1224361372 1237444605 1238202694 1244636063 1250575552 1253413386

ISBN: 9783030589608 electronic bk.) 3030589609 electronic bk.) 3030589595 9783030589592 9783030589615 print) 3030589617 9783030589622 print) 3030589625

Materia: Additive manufacturing Three-dimensional printing Additive manufacturing Three-dimensional printing

Autores: Heinrich, Andreas, editor

Enlace a formato físico adicional: Original 3030589595 9783030589592 (OCoLC)1182857605

Punto acceso adicional serie-Título: Springer series in optical sciences v. 233
