

1. Record Nr.	UNINA9911004805703321
Autore	Piotrowski Jozef <1943->
Titolo	High-operating-temperature infrared photodetectors / / Jozef Piotrowski, Antoni Rogalski
Pubbl/distr/stampa	Bellingham, Wash., : SPIE Press, c2007
ISBN	9781615837106 1615837108 9780819478375 0819478377
Descrizione fisica	1 online resource (256 p.)
Collana	Press monograph ; ; 169
Altri autori (Persone)	RogalskiAntoni
Disciplina	681/.25
Soggetti	Optical detectors Infrared detectors
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	Chap. 1. Introduction. 1.1. General remarks -- 1.2. Detector figures of merit -- 1.3. Detectivity requirements for thermal imagers -- 1.4. Cooling of ir detectors -- References. Chap. 2. Fundamental performance limitations of infrared photodetectors. 2.1. Infrared photon detector classifications -- 2.2. Theoretical model -- 2.3. Optimum thickness of a detector -- 2.4. Detector material figure of merit -- 2.5. Reducing device volume to enhance performance -- References. Chap. 3. Materials used for intrinsic photodetectors. 3.1. Semiconductors for intrinsic photodetectors -- 3.2. Hg _{1-x} Cd _x Te ternary alloys -- 3.3. Hg-based alternatives to HgCdTe -- 3.4 InAs/Ga _{1-x} In _x Sb Type II superlattices -- 3.5 Novel Sb-based materials -- 3.6 Lead salts -- References. Chap. 4. Intrinsic photodetectors -- 4.1. Optical absorption -- 4.2. Thermal generation-recombination processes -- 4.4. Modeling of high-temperature photodetectors -- References. Chap. 5. Hg _{1-x} Cd _x Te photoconductors -- 5.1. Simplified model of equilibrium mode photoconductors -- 5.2. Excluded photoconductors -- 5.3. Practical photoconductors -- 5.4. SPRITE detectors -- References.

Chap. 6. Hg_{1-x}Cd_xTe photodiodes -- 6.1. Theoretical design of Hg_{1-x}Cd_xTe photodiodes -- 6.2. Technology of Hg_{1-x}Cd_xTe photodiodes -- 6.3. Practical photodiodes -- References.

Chap. 7. Photoelectromagnetic, magnetoconcentration, and Demer IR detectors -- 7.1. PEM detectors -- 7.2. Magnetoconcentration detectors -- 7.3. Demer detectors -- References.

Chap. 8. Lead salt photodetectors -- 8.1. PbS and PbSe photoconductors -- 8.2. Lead salt photovoltaic detectors -- References.

Chap. 9. Alternative uncooled long-wavelength IR photodetectors -- 9.1. HgZnTe and HgMnTe detectors -- 9.2. III-V detectors -- 9.3. InAs/Ga_{1-x}In_xSb type-II superlattice detectors -- 9.4. Thermal detectors -- References.

Chap. 10. Final remarks -- 10.1. Summary of progress to date -- 10.2. Directions for future development -- References -- Index.

Sommario/riassunto

This book presents approaches, materials, and devices that eliminate the cooling requirements of IR photodetectors operating in the middle- and long-wavelength ranges of the IR spectrum. It is based mainly on the authors' experiences in developing and fabricating near room temperature HgCdTe detectors at Vigo Systems Ltd. and at the Institute of Applied Physics Military University of Technology (both in Warsaw, Poland). The text also discusses solutions to other specific problems of high-temperature detection, such as poor collection efficiency due to a short diffusion length, the Johnson-Nyquist noise of parasitic impedances, and interfacing of very low resistance devices to electronics. Suitable for graduate students in physics and engineering who have received a basic preparation in modern solid state physics and electronic circuits, this book will also be of interest to individuals who work with aerospace sensors and systems, remote sensing, thermal imaging, military imaging, optical telecommunications, IR spectroscopy, and lidar.
