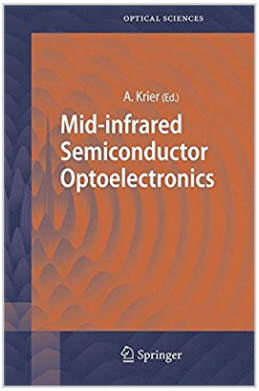

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Optoelectronic devices operating in the mid-infrared wavelength range offer applications in a variety of areas from environmental gas monitoring around oil rigs to the detection of narcotics. They could also be used for free-space optical communications, thermal imaging applications and the development of "homeland security" measures.

Mid-infrared Semiconductor Optoelectronics is an overview of the current status and technological development in this rapidly emerging area; the basic physics, some of the problems facing the design engineer and a comparison of possible solutions are laid out; the different lasers used as sources for mid-infrared technology are considered; recent work in detectors is reviewed; the last part of the book is concerned with applications.

With a world-wide authorship of experts working in many mid-infrared-related fields this book will be an invaluable reference for researchers and graduate students drawn from physics, electronic and electrical engineering and materials science.

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Editorial Review

From the Back Cover

The practical realisation of optoelectronic devices operating in the 2–10 μm (mid-infrared) wavelength range offers potential applications in a variety of areas from environmental gas monitoring around oil rigs and landfill sites to the detection of pharmaceuticals, particularly narcotics. In addition, an atmospheric transmission window exists between 3 μm and 5 μm that enables free-space optical communications, thermal imaging applications and the development of infrared measures for "homeland security". Consequently, the mid-infrared is very attractive for the development of sensitive optical sensor instrumentation.

Unfortunately, the nature of the likely applications dictates stringent requirements in terms of laser operation, miniaturisation and cost that are difficult to meet. Many of the necessary improvements are linked to a better ability to fabricate and to understand the optoelectronic properties of suitable high-quality epitaxial materials and device structures. Substantial progress in these matters is presented here.

Mid-infrared Semiconductor Optoelectronics is an overview of the current status and technological development in this rapidly emerging area. It is composed of four parts. First, the basic physics and some of the main problems facing the design engineer (together with a comparison of possible solutions) are laid out. Next, there is a consideration of the multifarious lasers used as sources for mid-infrared technology, including an inspection of current approaches to the lack of such a source in the 3–4 μm region. Part III reviews recent work in light-emitting diodes and detectors and also deals with negative luminescence. The final part of the book is concerned with applications and highlights, once more, the diversity and technological importance of the mid-infrared spectral region.

With a world-wide authorship of experts working in a number of different mid-infrared-related fields *Mid-infrared Semiconductor Optoelectronics* will be an invaluable reference for researchers and graduate students drawn from backgrounds in physics, electronic and electrical engineering and materials science. Its breadth and thoroughness also make it an excellent starting point for further research and investigation.

About the Author

Professor Anthony Krier is the head of the Condensed Matter Division of the Physics Department at Lancaster University, UK. His research is in the optoelectronic properties of semiconductor and polymer materials and the fabrication of diode and laser devices emitting in the 2–10 μm (mid-infrared) range. He is the co-ordinator of the Mid-infrared Network. This EPSRC (UK’s Engineering and Physical Sciences Research Council) network has been created to bring together expertise and facilitate research in key areas of semiconductor materials growth, device physics and fabrication in order to advance the technology of mid-infrared optoelectronics. The network links centres of excellence throughout the UK and Europe. This book represents a collaboration between many of these labs which has been substantially supplemented (nearly 50% of the text) by contributions from leading American researchers in this field.

Users Review

From reader reviews:

James Dorman:

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