Special Issue

III-V Semiconductor Optoelectronics: Materials and Devices

Message from the Guest Editors

III-V semiconductor materials, such as GaN, GaAs, InAs, InP, and GaSb, possess excellent optical properties, which normally act as a gain medium of light sources with large-scale emission wavelengths from visible to mid-infrared bands. Nowadays, tremendeous progresses have been made in the field of III-V light sources and detectors, such as near-infrared InAs quantum dot-based lasers and mid-infrared GaSb-based quantum cascade lasers, among many others. In addition, III-V materials (InAs, InSb, etc.) have much higher electron mobilities than Si, which have broad applications in high-speed electronic and radio frequency (RF) devices, including field effect transistors (FETs) and high-electron-mobility transistors (HEMTs). The heterogenous integration and direct growth of III-V materials marks a foundamental step towards next-generation optoelectronics. Many methods, including metal-organic chemical vapor deposition (MOCVD), molecular beam epitaxy (MBE), and heterogeneous bonding, have been developed to achieve high-quality III-V functional structures, such as quantum well structures, quantum dots, and nanostructures.

Guest Editors

Dr. Ting Wang
Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China

Dr. Wenqi Wei
Songshan Lake Materials Laboratory, Dongguan 523808, China

Deadline for manuscript submissions

closed (10 July 2024)

Materials

an Open Access Journal by MDPI

Impact Factor 3.2
CiteScore 6.4
Indexed in PubMed

mdpi.com/si/134814

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Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
materials@mdpi.com

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Editor-in-Chief

Prof. Dr. Maryam Tabrizian
1. Department of Biomedical Engineering, Faculty of Medicine and Health Sciences, McGill University, Montreal, QC H3A 2B6, Canada
2. Faculty of Dentistry and Oral Health Sciences, McGill University, 3640 Rue University, Montreal, QC H3A 0C7, Canada

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