



III-V Semiconductor Optoelectronics: Materials and Devices

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

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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, tremendous 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 fundamental 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.





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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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Materials Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

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