

Current State of Ga₂O₃-Based Electronic and Optoelectronic Devices.

Brief Review

A. A. Petrenko¹, Ya. N. Kovach¹, D. A. Bauman¹, M. A. Odnoblyudov^{1,2}, [V. E. Bougrov](#)¹
and [A.E. Romanov](#)^{1,3}

¹[Institute of Advanced Data Transfer Systems, ITMO University, Kronverksky Pr. 49, bldg. A, St. Petersburg, 197101, Russia](#)

²[Peter the Great St. Petersburg Polytechnic University, Polytechnicheskaya 29, St. Petersburg, 195251, Russia](#)

³[Ioffe Physical-Technical Institute, Russian Academy of Sciences, Polytechnicheskaya 26, St. Petersburg, 194021, Russia](#)

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Corresponding author: [A. A. Petrenko](#)

Abstract. In this review, we consider the main gallium oxide areas of application in electronics and optoelectronics with focus on power electronics devices (rectifiers, field effect transistors), solar-blind photodetectors, luminescent devices, gas sensors, spintronic and memory devices. As an introduction, we provide the valuable data on the basic physical properties of the existing Ga₂O₃ polymorphic modifications. We discuss device design based on various gallium oxide crystalline forms including those exploring Ga₂O₃ single crystals, thick layers, thin films, nanostructures, and Ga₂O₃-based heterostructures. Then, the information on the parameters and characteristics of electronic and optoelectronic devices based on gallium oxide is presented. In addition, recently emerging and requiring additional research Ga₂O₃ application fields such as photocatalysis and thermomechanical actuating, are briefly addressed.

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