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GaN-Based 2D and 3D Architectures for Electronic Applications

Abstract

In this paper we demonstrate the fabrication of electronic devices based on GaN nanostructures. For fabrication of 2D and 3D GaN nanostructures, Surface Charge Lithography (SCL) and Hydride Vapor Phase Epitaxy (HVPE) techniques were used. A memristor device based on GaN ultrathin membranes with the thickness of 15 nm obtained by SCL was elaborated. For GaN microtetrapods growth, the HVPE method was used, where ZnO microtetrapods were used as sacrificial template. Because of the high temperature in the reactor and presence of hydrogen gas, ZnO is decomposed, resulting in the formation of ultra-porous hollow GaN microtetrapods. A hydrostatic pressure sensor based on GaN hollow microtetrapods with the wall thickness of 80 nm covering the pressure interval up to 40 atm was fabricated and characterized.