

Photoelectrochemical method for texturing the monocrystal InP

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Needs of modern society in processing and transfer of the growing information content lead to the formation of the super-high-speed optoelectronic integrated circuits based on silicon and binary semiconductors. This paper is dedicated to the problem of the increase in p-InP effective area that is realized by the surface texturing method, which becomes more and more popular among scientists and engineers. Such structures can find application in sensor (since their sensitivity depends on the surface area) and solar cell (possibility of the accumulation of a record amount of energy) manufacturing.

For the experiment we chose the samples of monocrystalline p-InP with the carrier concentration of $2,3 \times 10^{18} \text{ cm}^{-3}$. Solutions of etching, bromide and hydrochloric acids were used as the electrolyte. The current density varied in the range from 30 to 180 mA/cm, the etching time was 5 - 30 min. During the etching of plates the regime of sample illumination by the tungsten lamp of the power from 20 to 250 W was used.

Figure 1 demonstrates the morphology of the textured InP plate. As seen from this figure, the dense system of pyramidal growths with the slope connected with the crystal anisotropy and current direction is formed on the monocrystal surface. The pyramid height varies from 0,7 to 1,1 μm .

In the present work the texturing method of the monocrystal p-InP surface is proposed. This method is technically simple, cheap reagents are used for its realization, it does not need special equipment and therefore it is economic one.

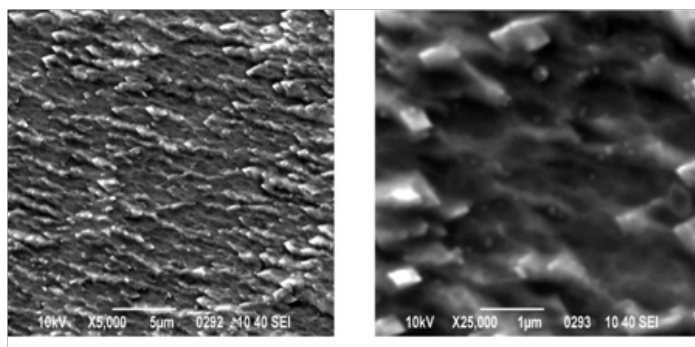


Figure 1: p-InP textured structure: The etchant composition is HBr:H₂O 1:1; the current density is 150 mA/cm²; the etching time is 8 minutes; the power of the tungsten lamp is 200 W.

Biography

Suchikova Yana is the Senior Lecturer of the department of teaching physical and mathematical disciplines and information technology in education from Berdyansk State Pedagogical University. She has published more than 100 papers, which includes 20 articles, 3 Monograph, 11 patents, Abstracts and Proceedings of conferences. Achievements: grant of the Cabinet of Ministers of Ukraine for young scientists; Victory in All-Ukrainian competition "Inventions - 2010" in absolute nomination "Best invention - 2010"; Diploma finalist Festival of Innovative projects "Sykorsky Challenge"; Winner of the prize of Leonid Kuchma's President Fund.

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