# Article information:

Planar InAs/AlSb HEMTs With Ion-Implanted Isolation | IEEE Journals & Magazine | IEEE Xplore  
<https://ieeexplore-ieee-org.libproxy1.nus.edu.sg/abstract/document/6163342>

# Article summary:

1. Planar InAs/AlSb HEMTs based on ion-implantation isolation technology have been fabricated and characterized, demonstrating excellent dc and RF performances.

2. The ion-implantation technique solves the well-known oxidation issue of the AlSb epilayers, ensuring much higher device reliability.

3. The ion-implantation technology will permit removing the conductive AlGaSb buffer from the heterostructure, enabling the fabrication of HEMT devices with improved electrical performance.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article titled "Planar InAs/AlSb HEMTs With Ion-Implanted Isolation" reports on the fabrication and performance of planar InAs/AlSb high-electron-mobility transistors (HEMTs) based on ion-implantation isolation technology. The authors demonstrate that the ion-implantation technique can be utilized for fabricating oxidation-resistant and planar Sb-based HEMTs and MMICs, which can dramatically improve the suitability of InAs/AlSb HEMTs for high-frequency and ultralow-power MMIC applications.

The article provides a detailed description of the epitaxial structure and device fabrication process used to create the InAs/AlSb HEMT. The authors also report on the electrical characterization of the device, including dc and S-parameter measurements performed utilizing an HP4156B parameter analyzer and an Agilent N5250C PNA. The results show that the fabricated devices exhibit excellent dc and RF performances such as a high drain current of 900 mA/mm, a peak transconductance of 1180 mS/mm, and an fT/fmax ratio of 210 GHz/180 GHz at a low drain bias of 0.3 V.

One potential bias in this article is that it focuses solely on the benefits of using ion-implantation isolation technology for fabricating InAs/AlSb HEMTs. While the authors acknowledge some limitations with other isolation techniques such as mesa etching or air-bridge-gate technology, they do not provide a comprehensive comparison between these techniques and ion-implantation isolation. Additionally, there is no discussion about any potential risks associated with using ion implantation for device isolation.

Another limitation is that while the authors report excellent electrical performance results for their fabricated devices, they do not provide any information about their reproducibility or yield. This information would be important to assess whether this technology is scalable for mass production.

Overall, this article provides valuable insights into using ion-implantation isolation technology for fabricating InAs/AlSb HEMTs with improved stability against oxidation. However, readers should be aware of potential biases in favor of this technique and limitations in terms of comparing it to other isolation methods or assessing its scalability for mass production.

# Topics for further research:

* Comparison of ion-implantation isolation with other isolation techniques for HEMT fabrication
* Risks associated with using ion implantation for device isolation
* Reproducibility and yield of ion-implantation isolated InAs/AlSb HEMTs
* Optimization of ion-implantation parameters for HEMT fabrication
* Impact of ion-implantation isolation on device reliability and lifetime
* Integration of ion-implantation isolated InAs/AlSb HEMTs into practical MMIC applications

# Report location:

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