PURE AND DISORDERED GROUP III NITRIDE HETEROSTRUCTURES: GROWTH AND PHYSICAL PROPERTIES

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MBE growth of GaN and its alloys has advanced to the level where its is now the technique that has demonstrated the highest quality group III nitride layers and heterostructures. In this presentation we review our work on three main topics: (i) the realization of high electron mobility and high hole mobility bulk GaN by NH_3 MBE [1]. The work on p-GaN demonstrates the importance of *reduced* growth temperature to avoid natural compensation by native donors [2]. (ii) For lateral electron devices, we demonstrate the realization of pure AlN interlayers (via atom probe tomography) by plasma-assisted MBE for AlGaN/AlN/GaN and InAlN/AlN/GaN high electron mobility transistors [3]. The pure AlN interlayer allows the realization of record low sheet resistance 2DEGs. (iii) We demonstrate the surprising role that natural alloy fluctuations play in the vertical transport through nominal alloy heterobarriers [4,5]. In all of these studies, MBE has played an essential role in understanding the physical properties of the group III nitrides.

Keywords: MBE; Gallium Nitride; Transport

References

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