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Built in polarization and thermal property of AlGa_N/Ga_N heterostructure

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Condition: New. Publisher/Verlag: LAP Lambert Academic Publishing | Nitride heterostructures are of outstanding current interest for a wide range of device applications. Al_xGa_{1-x}N/GaN heterostructure devices operate at high power and high frequencies. Therefore, strong self-heating effect is expected in the AlGa_N/Ga_N heterostructure. The physical phenomena responsible for the self-heating effect and properties that can minimize the effect should be explored. The intensity of polarization field at the interface of AlGa_N/Ga_N heterostructure is of the order of several MV/cm. These fields are common feature of nitride heterostructures which significantly influences the distribution and mobility of carriers; hence have profound impact on optical, thermal and electrical properties of the heterostructures. In this work, the effect of built in field on thermal transport properties of heterostructure to minimize the self-heating has been presented. This study shows that polarization field contributes to the elastic constant of nitrides and enhances the phonon group velocity which makes phonon mean free path longer. High Debye temperature gives a positive contribution to thermal conductivity. This study will be useful for minimization of self-heating process. | Format: Paperback | Language/Sprache: english | 88 pp.



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