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Low-temperature growth of GaSb epilayers on GaAs (001) by molecular beam epitaxy

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Abstract:

Non-intentionally doped GaSb epilayers were grown by molecular beam epitaxy (MBE) on highly mismatched semi-insulating GaAs substrate (001) with 2 offcut towards [110]. The effects of substrate temperature and the Sb/Ga flux ratio on the crystalline quality, surface morphology and electrical properties were investigated by Nomarski optical microscopy, X-ray diffraction (XRD) and Hall measurements, respectively. Besides, differential Hall was used to investigate the hole concentration behaviour along the GaSb epilayer. It is found that the crystal quality, electrical properties and surface morphology are markedly dependent on the growth temperature and the group V/III flux ratio. Under the optimized parameters, we demonstrate a low hole concentration at very low growth temperature. Unfortunately, the layers grown at low temperature are characterized by wide FWHM and low Hall mobility.