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Compositional and Surface Effects of Bismuth Incorporation in GaSb Films C. RYAN TAIT, ADAM DUZIK, JOANNA MILLUNCHICK, Materials Science and Engineering, University of Michigan — III-V-Bi semiconductor films represent a new class of highly mismatched alloys that exhibit interesting properties including large reduction in band gap, giant spin orbit bowing, and preserved electron mobility at the expense of hole mobility. These compounds have proven difficult to grow with most results coming from experimentation with GaAsBi with little known regarding GaSbBi. Various growth conditions were tested for GaSbBi and characterized with scanning electron microscopy, x-ray diffraction, and Rutherford backscattering spectroscopy. The films demonstrate Bi concentrations of up to 12% with as low as 3% droplet coverage. Surface Bi and Ga droplet morphology was shown to be dependent on relative flux ratios of Ga, Sb, and Bi and independent of film growth rate. Additionally it is found that As incorporates into the films with no intentional source and the incorporation being dependent on Bi incorporation. This effect is identified as an auto-compensation mechanism for the strain induced from the introduction of Bi.

Christopher Tait
University of Michigan, Ann Arbor, Materials Science and Engineering

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