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Rutherford backscattering measurements of Bi mole fraction and site distribution in InAsBi ARVIND J. SHALINDAR, PRESTON T. WEBSTER, BARRY J. WILKENS, TERRY L. ALFORD, SHANE R. JOHNSON, Arizona State University — Several narrow bandgap InAsBi layers grown by molecular beam epitaxy are structurally examined using Rutherford backscattering spectrometry (RBS) and x-ray diffraction (XRD). The samples are 1 μm thick, nearly lattice matched to GaSb substrates, and grown at temperatures ranging from 270 to 280 C with As/In flux ratios from 0.96 to 1.05 and Bi/In flux ratios from 0.060 to 0.065 [1]. Transmission electron microscopy measurements of these samples indicate excellent crystallinity, no ordering, no visible defects over large lateral distances, and lateral fluctuation of the Bi mole fraction on a 100 nm length scale [2]. Random RBS measurements indicate that the average Bi content of the InAsBi sample set ranges from 5.0% to 6.5% and XRD measurements exhibit sidebands arising from the presence of small regions of InAsBi with lower Bi mole fractions than that specified by the main diffraction peak. RBS ion channeling measurements indicate the presence of approximately 1% interstitial Bi atoms. [1] P. T. Webster, N. A. Riordan, C. Gogineni, S. Liu, J. Lu, X.-H. Zhao, D. J. Smith, Y.-H. Zhang, S. R. Johnson, J. Vac. Sci. Technol., B, 32, 02C120 (2014) [2] J. Lu, P. T. Webster, S. Liu, Y.-H. Zhang, S. R. Johnson, D. J. Smith, J. Cryst. Growth 425, 250 (2015)

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