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Diffuse X-Ray Scattering from the Liquid-Vapor Interfaces of Dilute Ga:Bi and Ga:Tl alloys DONGXU LI, XU JIANG, STUART A. RICE, Department of Chemistry and James Franck Institute, the University of Chicago, BINHUA LIN, MATI MERON, CARS, the University of Chicago — X-Ray diffuse scattering and Grazing Incidence Diffraction from the liquid-vapor interfaces of dilute alloys Ga:Bi and Ga:Tl are measured. The contributions from bulk scattering and the diffraction of the segregated monolayer are subtracted, and the resulting intensity is diffuse scattering due to the interfacial roughness. Unlike the pure Ga case, the diffuse scattering intensity is found to follow the capillary type q^{-2} decay up to a larger wavevector $q \sim 2nm^{-1}$, and the reduction of wavevector dependent interfacial tension is not observed. The interfacial tensions and the two dimensional compressibility of the segregated monolayer are obtained by fitting the surface scattering intensities to a model with a q^{-2} diffuse scattering intensity and the diffraction from a $q2D$ monolayer. In the Ga:Tl case, the segregated Tl monolayer undergoes a first order phase transition, and the behavior of the diffuse scattering is not effected by the $q2D$ phase transition.

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