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Role of chemical potential and limitations of growth kinematics on stoichiometry of InSb nanowires ZAINA ALGARNI, USHA PHILIPOSE, Department of Physics, University of North Texas, Denton 76203 TX, USA — A study of the relationship between chemical potentials of the vapor-liquid and solid phases during indium antimonide (InSb) nanowire growth by VLS process will be presented. Nanowire growth kinematics is governed by interactions between the vapor phase, the spherical alloy droplet and the solid cylindrical nanowire. Using a simple model, the phase stability of the In-Sb liquid alloy droplet will be ascertained and confirmed by experiments. A recent study of the phase diagram of the In-Sb alloy nanoscale system shows a reduction in melting point and eutectic temperature, resulting in a high solubility of In in Sb on the Sb-rich eutectic side and of Sb in In on the In-rich eutectic side of the phase diagram, factors that affect the nanowire growth kinematics. Using the Gibbs-Thomson equation, a relation between supersaturation and concentration of In and Sb in droplet will be obtained. Experimental results showing the diameter dependence on nanowire stoichiometry will be presented with thicker nanowires having higher Sb content and thinner with high In content. .

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