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Dielectric Functions of $(Bi_xIn_{1-x})_2Se_3$ Films Grown on Sapphire Substrates[1] AOFENG BAI, FRANK PEIRIS, Department of Physics, Kenyon College, Gambier, Ohio 43022, USA, MARIA HILSE, ROMAN ENGEL-HERBERT, Department of Material Science and Engineering, Pennsylvania State University, State College, Pennsylvania 16802, USA., DEPARTMENT OF PHYSICS, KENYON COLLEGE, GAMBIER, OHIO 43022, USA COLLABORATION, DEPARTMENT OF MATERIAL SCIENCE AND ENGINEERING, PENNSYLVANIA STATE UNIVERSITY, STATE COLLEGE, PENNSY COLLABORATION — Analyzing a series of in-situ ellipsometry spectra of MBE-grown $(Bi_xIn_{1-x})_2Se_3$ films grown on sapphire substrates, we have explored how their dielectric functions varies with alloy concentration. Starting with the nominal thicknesses determined by RHEED, we fit both the thickness and the dielectric function of each film. The sapphire substrate was modelled with birefringent optical constants. The dielectric functions of $(Bi_xIn_{1-x})_2Se_3$ films were modelled using several Kramers-Kronig consistent oscillators. Upon further analysis, we have deduced how some of the main oscillator-parameters change with alloy concentration, which will be important if $(Bi_xIn_{1-x})_2Se_3$ alloys are to be used in optoelectronic applications.

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