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Anomalous Angular Nonstoichiometric Sputtering Yield of a Ga-In Eutectic Target[1] MARIEL KERBACHER, Southwestern University, J.W. DEATON, University of Louisiana at Lafayette, L.R. BURNS, N.T. DEOLI, D.L. WEATHERS, UNT, IBMAL TEAM — Sputtering is a thin film deposition technique in which an ion beam fired at a target ejects atoms from the top several layers of the target's surface allowing these atoms to deposit as a thin film on any nearby surface. We employed this technique to deposit the first layers of the Ga-In target onto an aluminum foil which we then analyzed using RBS to determine the angular distribution of sputtered material. The purpose of this experiment is to expand the base of scientific knowledge on sputtering and better understand the sputtering process in hopes of improving models of this process. The Ga-In eutectic alloy used in this experiment has a Gibbsian segregation, in which the first atomic monolayer of the surface is at least 94% Indium, while the second layer is primarily Gallium, as reflected in the alloy's bulk concentration (16.5% Indium). Therefore, the majority of Gallium deposited by sputtering originates from the second atomic monolayer or deeper in the sample. The eutectic alloy is a liquid at room temperature, which is ideal for sputtering processes. Liquid targets are self-healing; their composition does not change over time as atoms are ejected from their surface. Since we know that the majority of Gallium sputtered from the Ga-In target originates from below the first atomic monolayer, studying the angular distribution of Gallium isotopes reveals the behavior of atoms ejected from atomic layers beneath the first monolayer of a target during sputtering.

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