

Abstract Submitted
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In-situ chemical and structural characterization via RHEED-total reflection analysis of x-rays (TRAXS).¹ SANDEEP CHANDRIL, CAMERON KEENAN, THOMAS MYERS, DAVID LEDERMAN, West Virginia University — The use of x-ray fluorescence produced inside a molecular beam epitaxy chamber by the RHEED electron gun to simultaneously characterize the thin films for thickness, roughness and the chemical composition is described. This technique requires only slight modifications to the chamber and can be a powerful tool for beam flux calibration and in-situ analysis, especially where surfaces have to be protected under vacuum and for the stoichiometry control during growth. The angular dependence of the x-ray fluorescence signal from the thin film over the substrate is analyzed using Parratt's approach and simulating electrons' trajectories inside the film to account for grazing angle electron beam as a source for x-rays. We have found good agreement between the experiment and the theory for the thickness and roughness estimates. Experiments for chemical composition determination are currently underway.

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