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【534】Integrated Synchrotron X-ray and Raman Techniques for the Determination of the Fill Factor and Thickness of III-V Semiconductor Nanowire Layers grown on a Substrate

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The primary objective of this study is to propose a methodology for determining the fill factor and thickness of III-V semiconductor nanowire layer grown on a substrate. To achieve this goal, we utilized the surface phonon-peak positions in the Raman spectra, which correspond to the perturbation of the GaN nanowire (NW) surface, to model the dielectric environment near the surface and thus estimate the fill factor of the layer. The average radii of the nanowires were obtained through Small-Angle X-ray Scattering modeling, and employing the effective medium approximation, a quantitative analysis using Synchrotron X-ray Fluorescence was performed to ascertain the thickness of the nanowire layer. SEM images verified the results.

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