LAYTEC

MEMBER OF THE NYNOMIC GROUP

vol #1

EpiNet®'s "Algorithm Deep-Dive" series

# Learn how to analyze your in-situ data most efficiently

Fig. 1: Analysis screen of EpiNet® applying the "NKR adv virtual layer fit" allowing for simultaneous fitting of the refractive index n, the extinction coefficient k and the growth rate r for analyzing materials like AlGaAs. Here, the fit was exclusively applied to the process step marked in red.

| | |
|---|---|
| AbsRvs | Value:0.047, min.: 0, max.: 0 |
| D | Value:789.161, min.: 0, max.: 0 |
| K | Value:0.177, min.: 0, max.: 0 |
| N | Value:3.842, min.: 0, max.: 0 |
| PhiRvs | Value:6.281, min.: 0, max.: 0 |
| R | Value:0.806, min.: 0, max.: 0 |

Fig. 2: Results window displaying the values for the thickness (D; in nm), the extinction coefficient (K; dimensionless), the refractive index (N; dimensionless) and the growth rate (R; in nm/s).

## Algorithm profile

**Algo name: NKR adv virtual layer fit**

Short description:

- Analysis method for thick (>1 oscillation period visible) smooth layers of all (even unknown) materials.
- No optical properties need to be known.
- If available, further knowledge about the material properties can be used for restricting the parameter space. Here, either database values or data from external source can be used.
- The analysis will fit refraction index n, extinction coefficient k and growth rate r for reflectance transients obtained by LayTec's EpiCurve® TT and EpiTT.

Usage ideas and alternatives:

- Analysis of thick smooth layers like e.g. contact layers, buffer layers, etc.
- Use this analysis to gain temperature dependent n and k data for unknown materials by fixing the growth rate with thickness information about the layer from ex-situ measurements (e.g. XRD).
- For known materials, the multi-wavelength fits offer a faster and more precise analysis (to be covered in future volume of this series).

User instructions can be found in the manual and can be obtained via info@laytec.de.
Reference data is available within EpiNet®.