

**ORS**

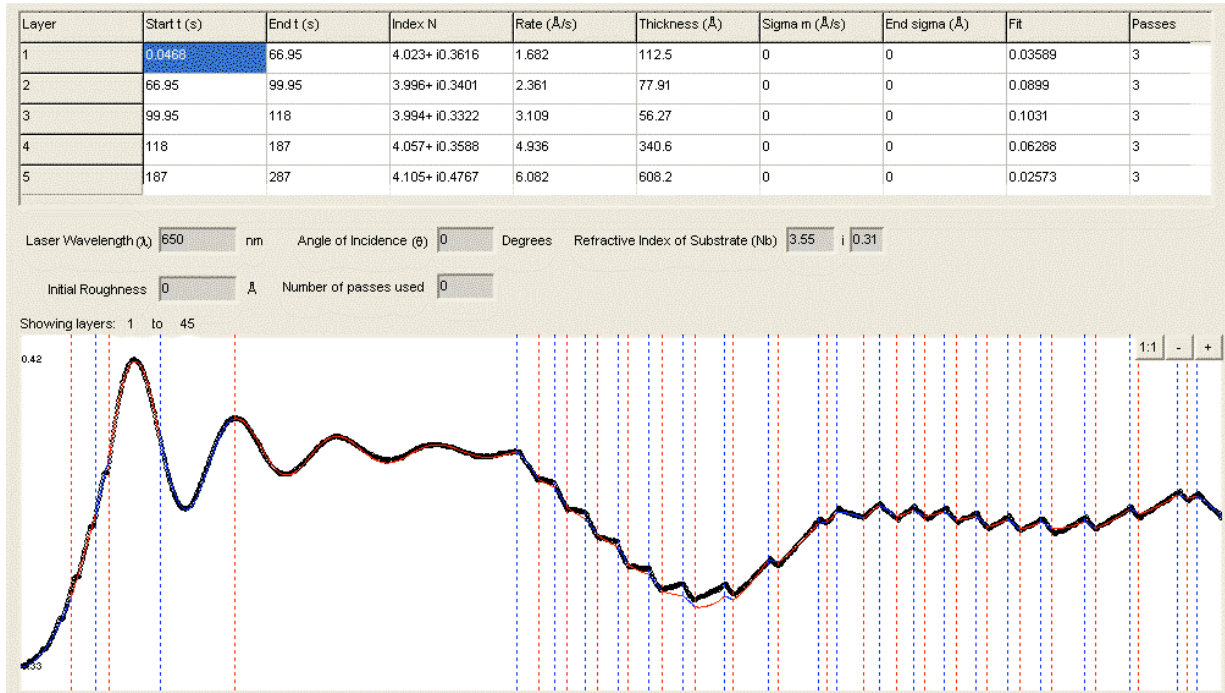
## APPLICATION NOTES

### In Situ Thickness Monitoring for Quantum Cascade Laser

#### Advantages of *in situ* monitoring for manufacturing Quantum Cascade Lasers

- ∞ Monitoring and analysis of layers less than 20Å;
- ∞ Automatic real-time analysis of growth rate allows for control of the QCL process;
- ∞ Yield improvement by ensuring individual layer thicknesses;
- ∞ Accurate time markers for start and end points for layers within a multilayer structure.

Live, *in situ* growth-rate monitoring provides a method to increase material quality for Quantum Cascade Laser structures. Figure 1 outlines the R-Fit analysis of the QCL structure.



**Figure 1 R-Fit analysis of full QCL Structure**

During the data analysis, it is possible to determine:

- ∞ Initial InGaAs layers (Layers 1 to 6 in the fit matrix) show an increase in the growth rate from 1.6Å/s to a steady 6Å/s;
- ∞ A corresponding change in the refractive index from 4.023n + i0.3616 to 4.113+ i0.4901.