

## FTPadvanced EXPERT

### *Product description*

The **FTPadvanced EXPERT** is an optional software package for advanced analysis of reflection measurements. It extends the standard software package of the **FTPadvanced** for the application of materials with unknown or not constant optical properties and offers a powerful tool to experienced users. Film thickness and refractive index of single films and each layer of a layer stack can be fitted.

The **FTPadvanced EXPERT** allows the user to model the optical response of unknown materials and to determine the model parameters within the accuracy of reflection measurements.

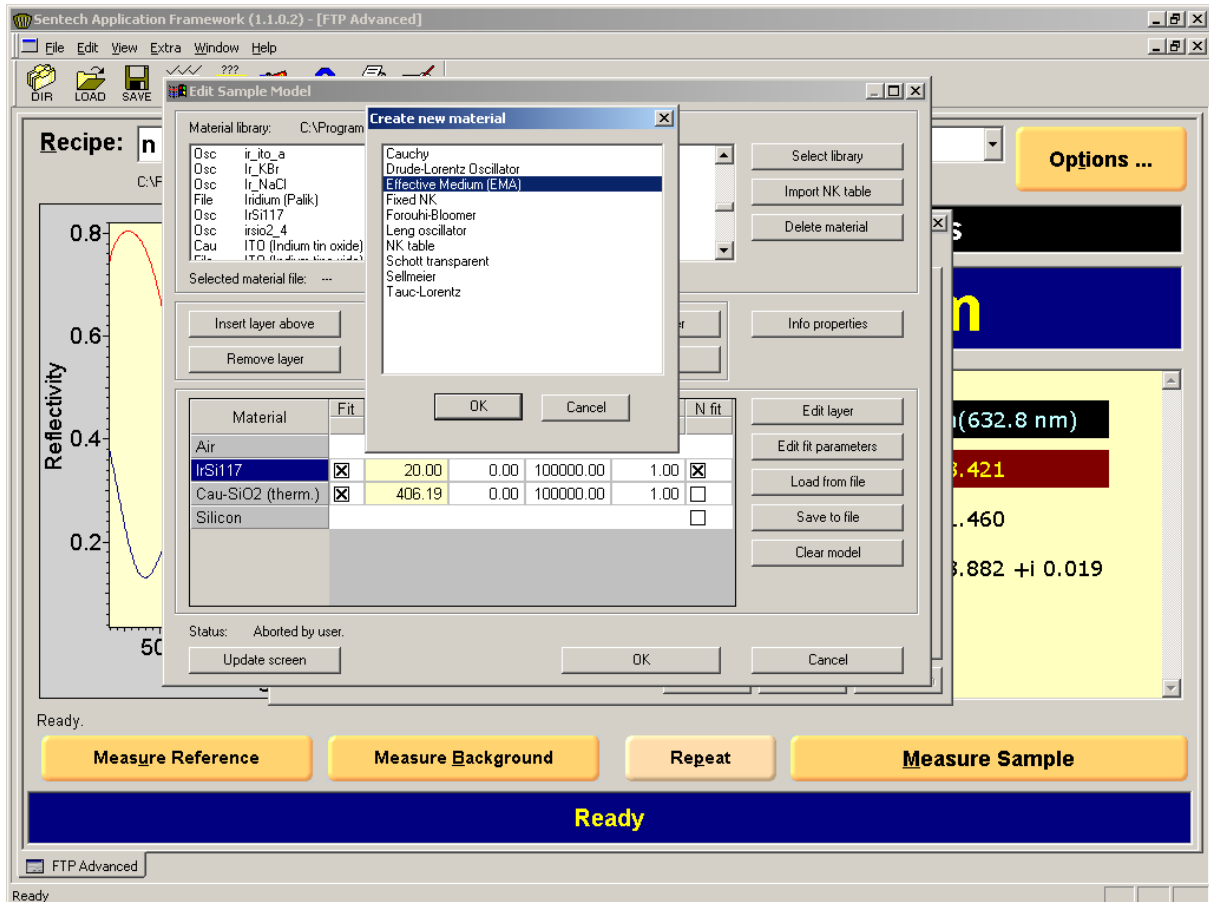
***A refractive index accuracy better than  $10^{-2}$  requires ellipsometric measurements in any case!***

The software package comprises a large and extendable material library based on tabulated material files as well as parameterised dielectric functions. Each parameter of a modelled material can be determined by fast fitting procedure.

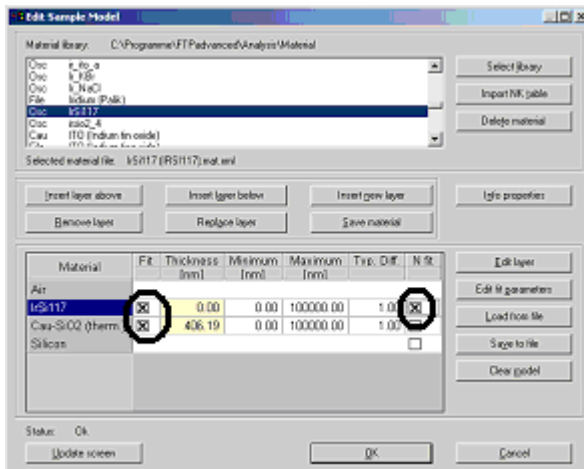
The available parameterised functions for optical dispersion relations are summarised in the next table:

<b>Dispersion Relation</b>	<b>Typical Application</b>
n,k fix	Air, Guess for weak spectral dependency, Backside of transparent substrates in restricted spectral range
Data table	Substrates
Cauchy	Transparent or weak absorbing films
Sellmeier	Transparent or weak absorbing films
Schott transparent	Glass substrates
Forouhi – Bloomer	Amorphous semiconductors
Leng oscillator, improved	(Poly)silicon, amorphous silicon
Drude – Lorentz – oscillator	Metals, absorbing organic materials
Tauc – Lorentz	(Poly)silicon, amorphous silicon
Effective medium approximation (EMA)	Roughness, interfaces

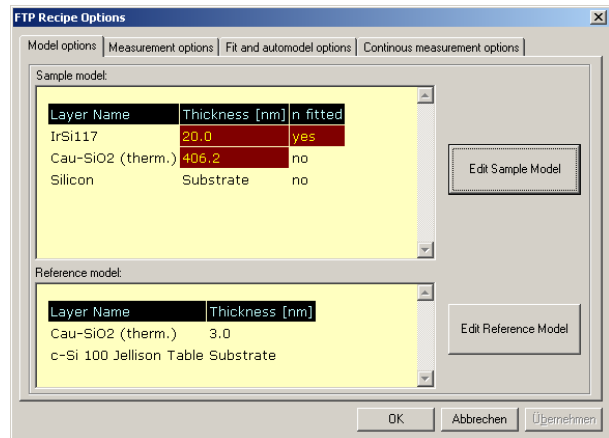
The software is based on the easy to use operational concept realised in the **FTPAdvanced** standard software. The next software screenshots give an overview about the main features of the **FTPAdvanced Expert** package.



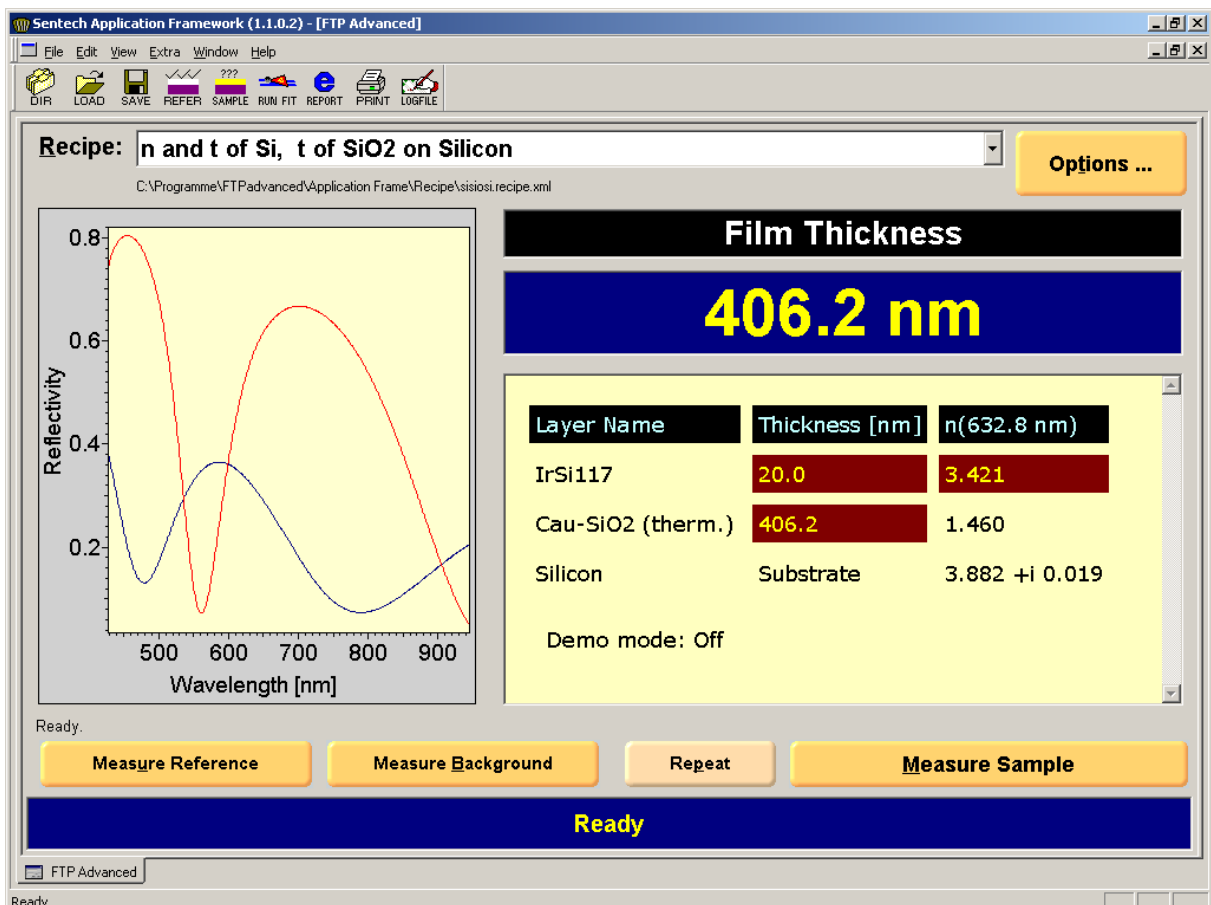
New materials can be created selecting the appropriate description of the optical response from a number of different functions. More than one layer thickness of a material stack can be fitted.



The capability of fitting the refractive index extends the application library to the analysis of layers with ever-changing material properties



The model options dialog displays each fitting parameter with a coloured background



If a more sophisticated model is analysed, the thickness of the lowest layer is displayed within the big thickness result area, the other results as the refractive indices or additional thicknesses are displayed below the thickness result area.

## Specifications

Software package for the **FTPadvanced** comprising

- Application framework for optical measurement instruments,
- FTPadvanced reflectivity measurement software,
- Extended material library,
- Capability of reflectivity analysis by fitting various model parameters like refractive index and film thickness

Build in dispersion relations:

- Constant values,
- Tabular values,
- Cauchy,
- Sellmeier,
- Forouhi – Bloomer,
- Drude-Lorentz oscillator,
- Schott, transparent,
- Tauc Lorentz,
- Leng oscillator, improved

## Requirements

(not part of the FTPadvanced EXPERT)

*FTPadv-1 or FTPadv-2*

*User PC*

Desktop PC with monitor, keyboard, mouse, 600MHz, 64MB RAM, Ethernet network adaptor 10MHz, CD-ROM drive, operating system: WinNT, Win2k, WinXP