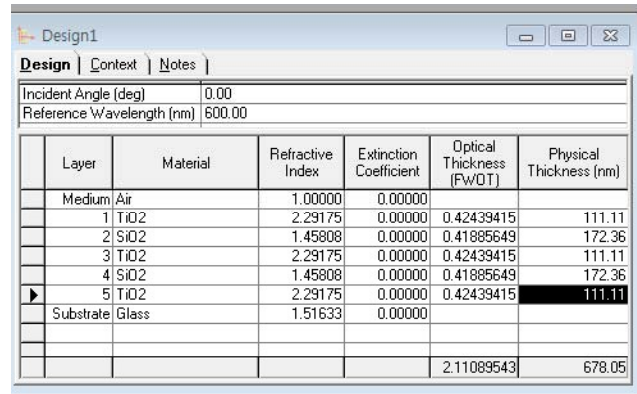


Analysis Tools

Design 파일이 활성화된 상태에서 "Tool > Analysis " 하면 총 9개의 분석 Tool에 대한 사용 설명서 입니다.

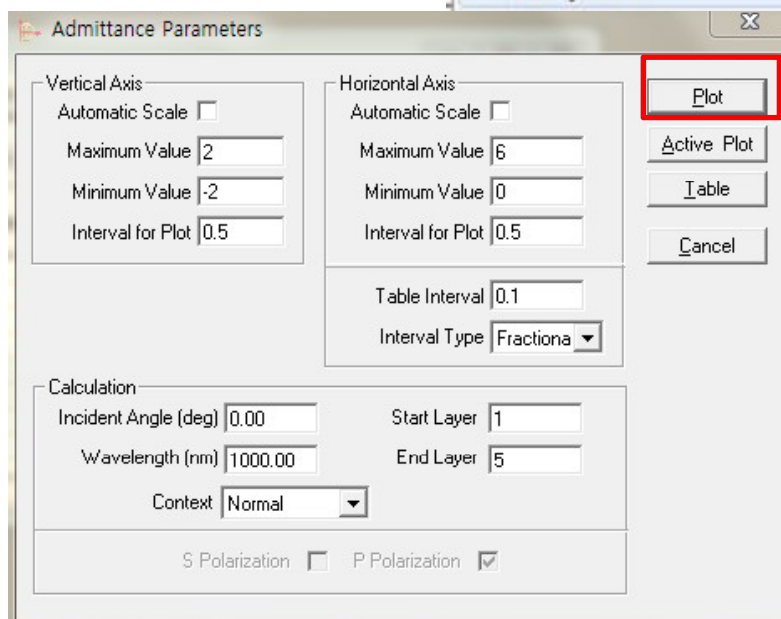
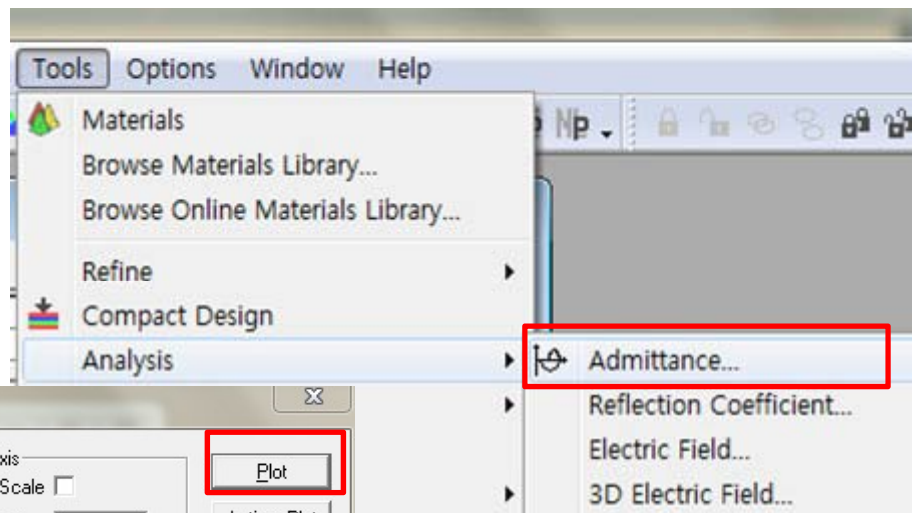
1. Admittance

File > New > Design



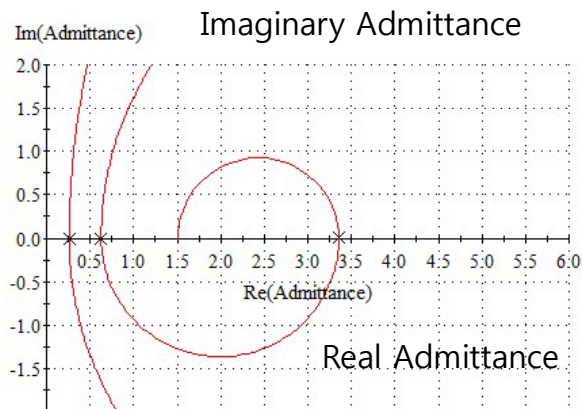
Layer	Material	Refractive Index	Extinction Coefficient	Optical Thickness (FWOT)	Physical Thickness (nm)
Medium	Air	1.00000	0.00000		
1	TiO2	2.29175	0.00000	0.42439415	111.11
2	SiO2	1.45808	0.00000	0.41885649	172.36
3	TiO2	2.29175	0.00000	0.42439415	111.11
4	SiO2	1.45808	0.00000	0.41885649	172.36
5	TiO2	2.29175	0.00000	0.42439415	111.11
Substrate	Glass	1.51633	0.00000		
				2.11089543	678.05

Tools > Analysis > Admittance...



Parameter 창에 data를 입력한 후, "Plot "

Design1: Admittance



Admittance Parameters

Vertical Axis

Automatic Scale ☒

Maximum Value 2

Minimum Value -2

Interval for Plot 0.5

Horizontal Axis

Automatic Scale ☒

Maximum Value 6

Minimum Value 0

Interval for Plot 0.5

Plot

Active Plot

Table

Calculation

Incident Angle (deg) 0.00

Wavelength (nm) 1000.00

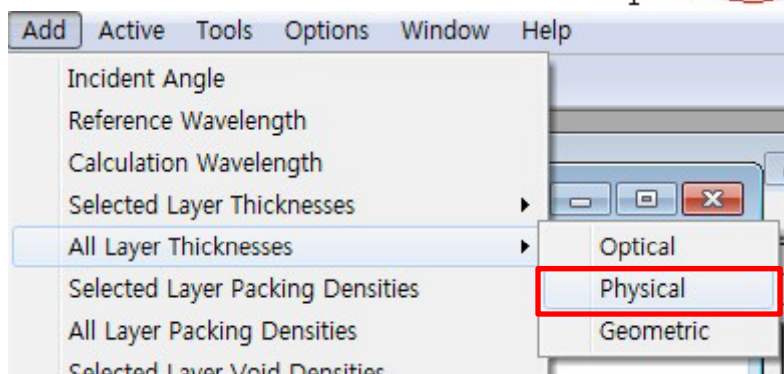
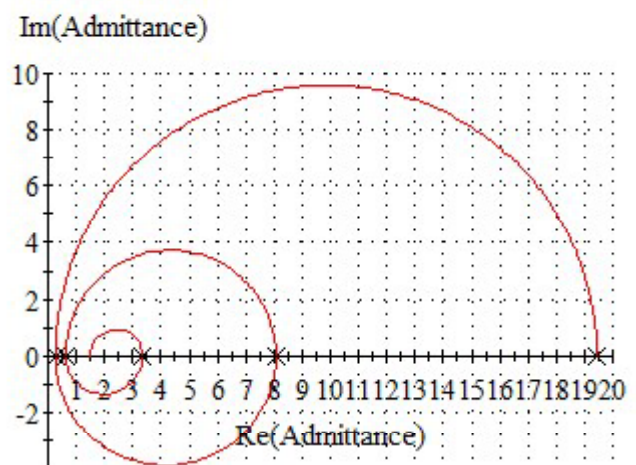
Context Normal

Start Layer 1

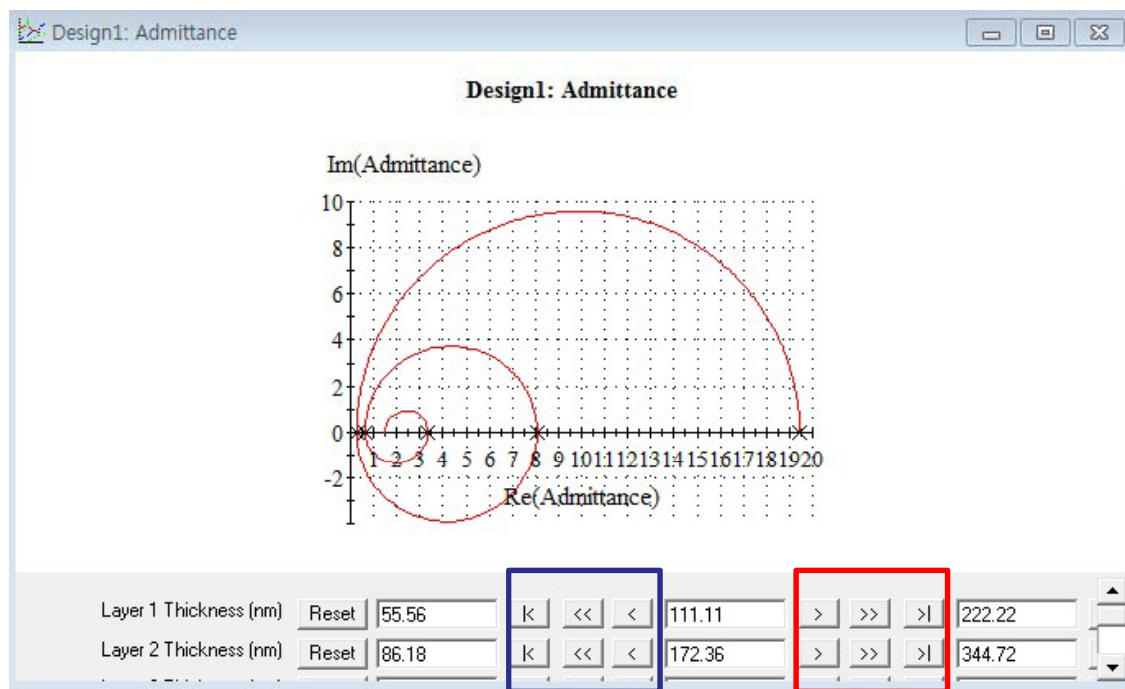
End Layer 5

S Polarization ☐ P Polarization ☒

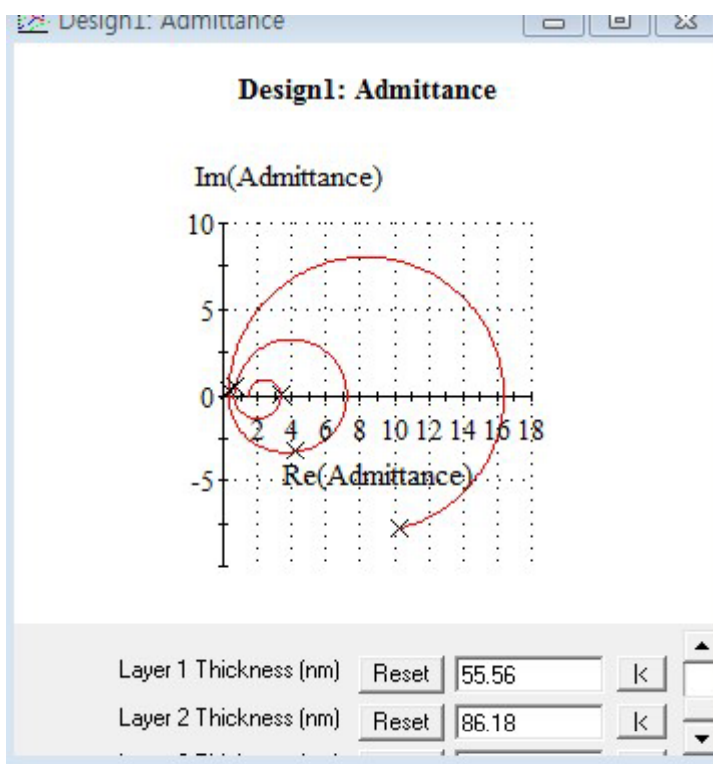
Design1: Admittance



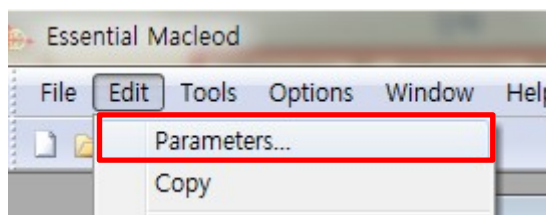
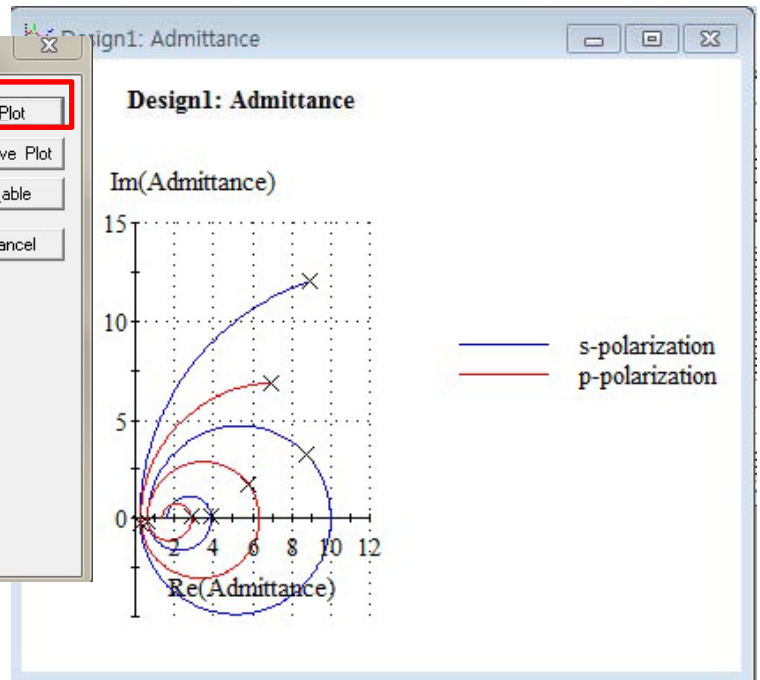
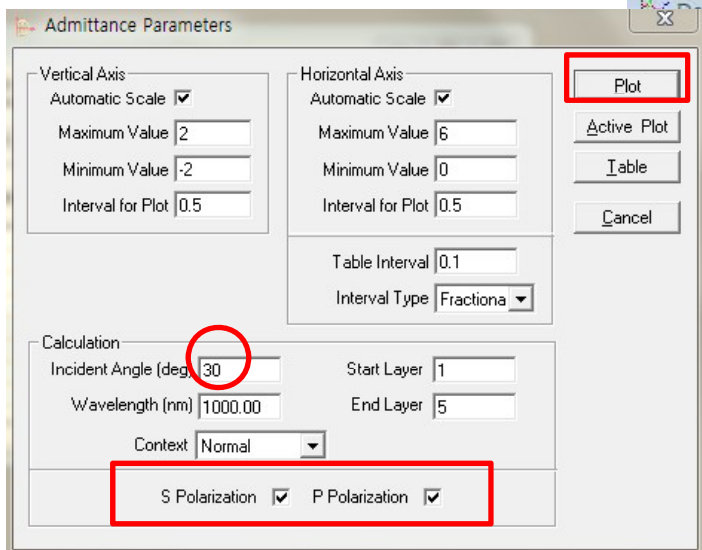
Add > All Layer Thickness
> Physical



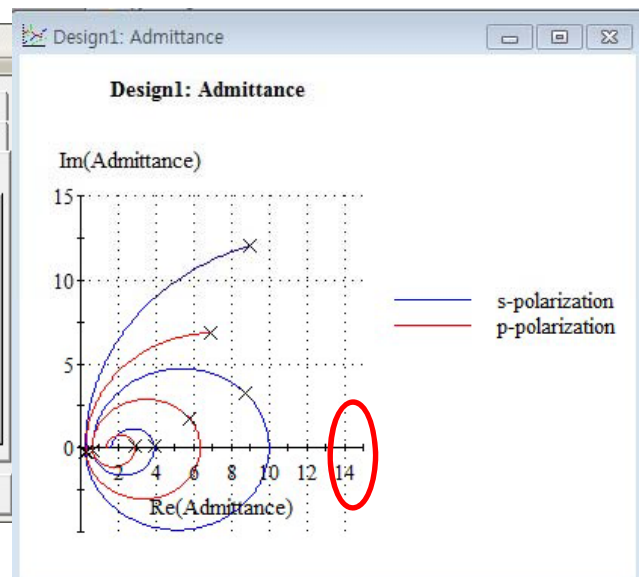
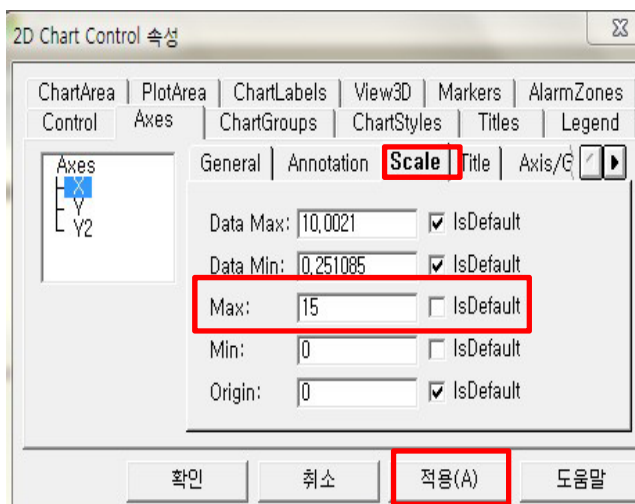
Layer별 Thickness Down/Up 버튼



Thickness 조정에 따른 값 변화

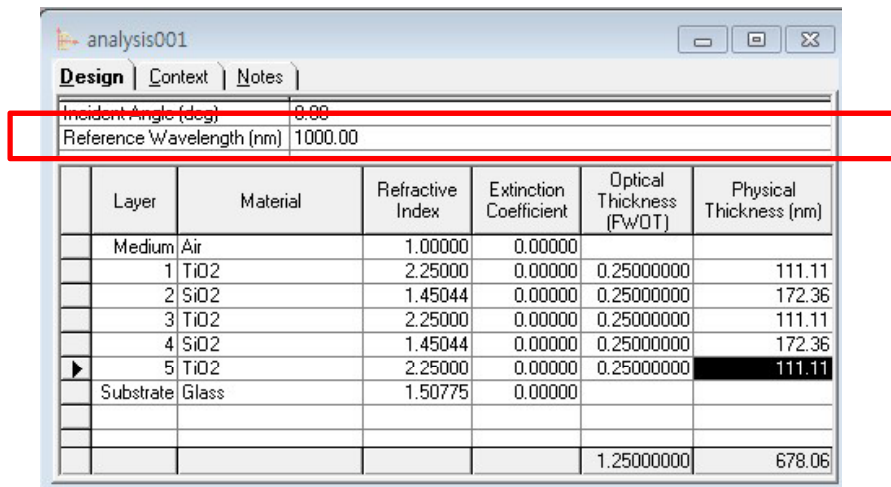


Plot Window가 활성화된 상태에서
"Edit > Parameters "



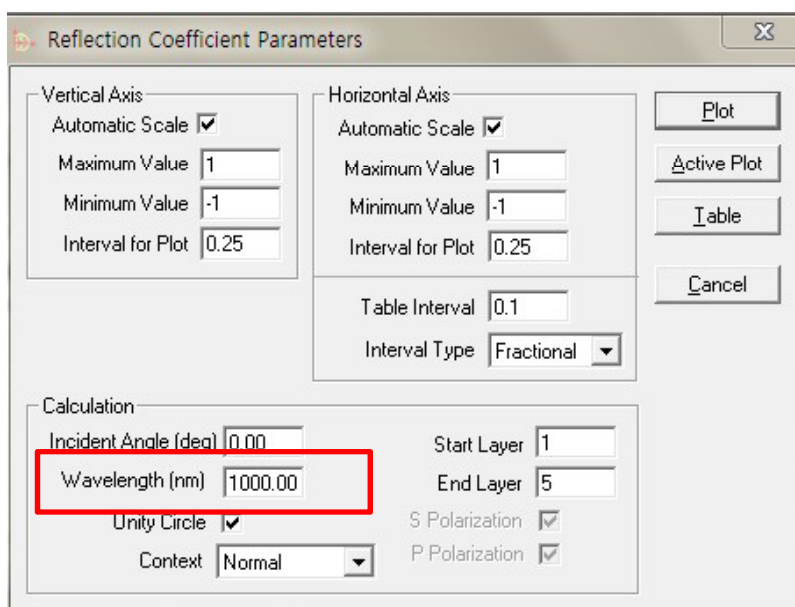
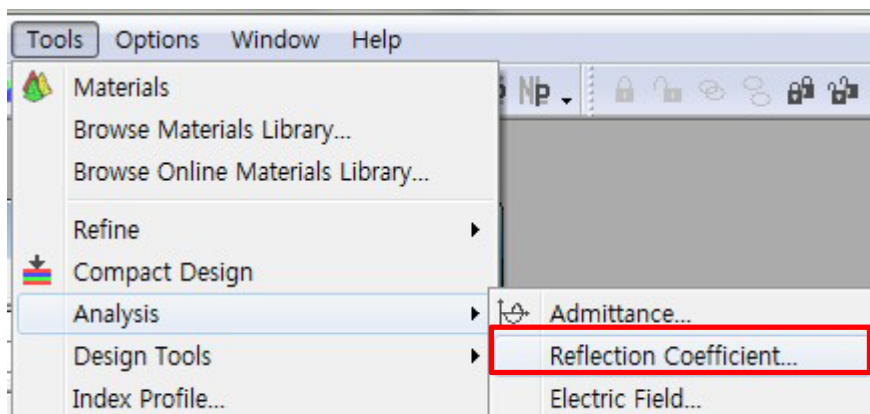
Plot 표시될 항목의 조건 변경, "적용" 하면 변경된 사항대로 보여 줌.

2. Reflection Coefficient...



Layer	Material	Refractive Index	Extinction Coefficient	Optical Thickness (FWD)	Physical Thickness (nm)
Medium	Air	1.00000	0.00000		
1	TiO2	2.25000	0.00000	0.25000000	111.11
2	SiO2	1.45044	0.00000	0.25000000	172.36
3	TiO2	2.25000	0.00000	0.25000000	111.11
4	SiO2	1.45044	0.00000	0.25000000	172.36
5	TiO2	2.25000	0.00000	0.25000000	111.11
Substrate	Glass	1.50775	0.00000		
				1.25000000	678.06

Tools > Analysis > Reflection Coefficient...



Reflection Coefficient Parameters

Vertical Axis
Automatic Scale ☒
Maximum Value
Minimum Value
Interval for Plot

Horizontal Axis
Automatic Scale ☒
Maximum Value
Minimum Value
Interval for Plot
Table Interval
Interval Type

Calculation
Incident Angle (deg)
Wavelength (nm)
Unity Circle ☒
Context

Start Layer
End Layer
S Polarization ☒
P Polarization ☒

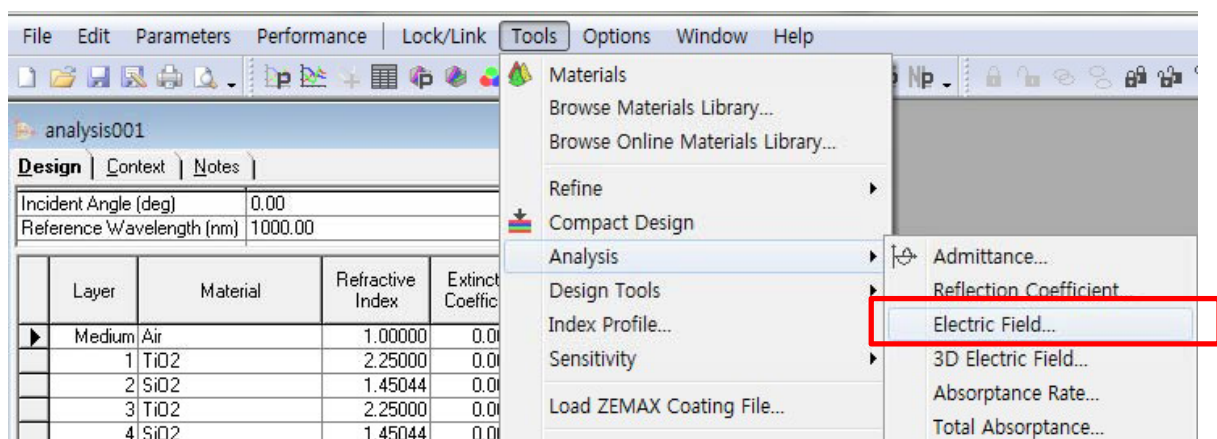
Buttons: Plot, Active Plot, Table, Cancel



analysis001: Reflection Coefficient

3. Electric Field...

Tools > Analysis > Electric Field...



박막 코팅의 성능은 정지파(Standing Waves)에서의 간섭 효과 및 결과에 의존 되는데 전기장(Electric field)가 가장 높은 곳에서 흡수 및 산란으로 인한 손실이 가장 높아 이런 정지 파를 수반하는 전기장 진폭의 변동은 매우 중요 할 수가 있는데 그러므로 전기장 분포는 손실이 매우 낮거나 높은 곳에서의 코팅 분석 및 설계에 매우 중요한 하나의 Tool 입니다.

Electric Field Parameters

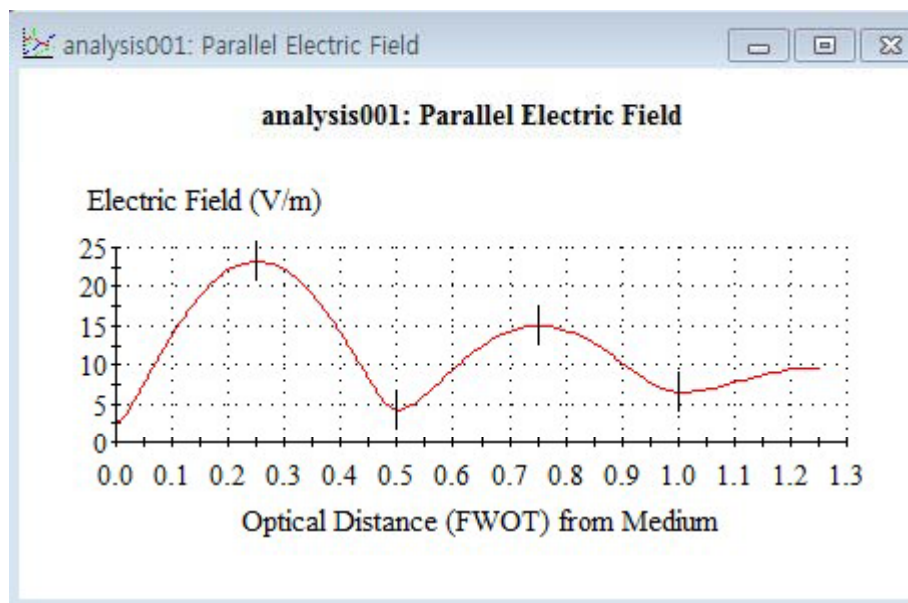
Vertical Axis (V/m)
 Type: **Amplitude**
 Parallel Field ☐
 Normal Field ☐
 Total Field ☒

Automatic Scale ☒
 Maximum Value
 Minimum Value
 Interval for Plot

Horizontal Axis
 Show Medium ☐
 Medium Depth
 Start Layer
 Show Substrate ☐
 Substrate Depth
 End Layer
 Table Interval
 Interval Type **Fractional**

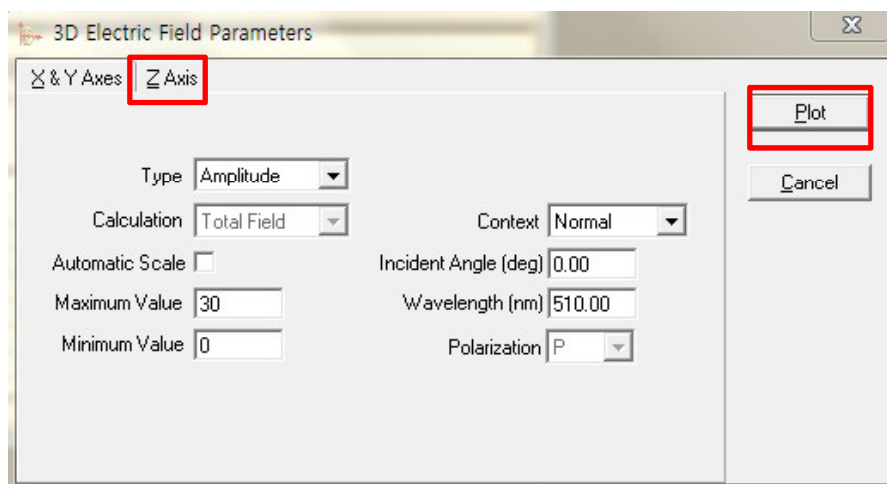
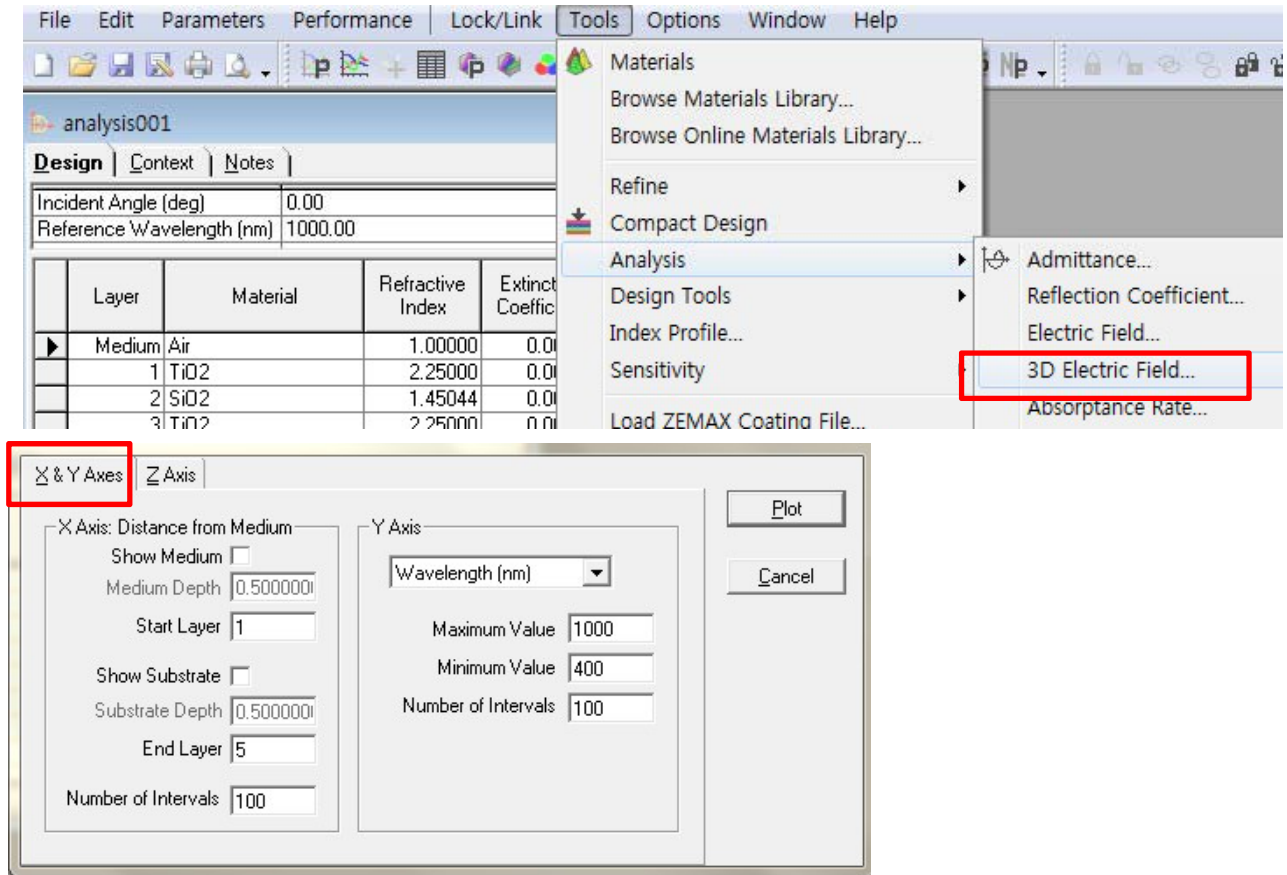
Calculation
 Incident Angle (deg)
 Wavelength (nm)
 Context **Normal**
 S Polarization ☒
 P Polarization ☒

Plot
 Active Plot
 Table
 Cancel



4. 3D Electric Field...

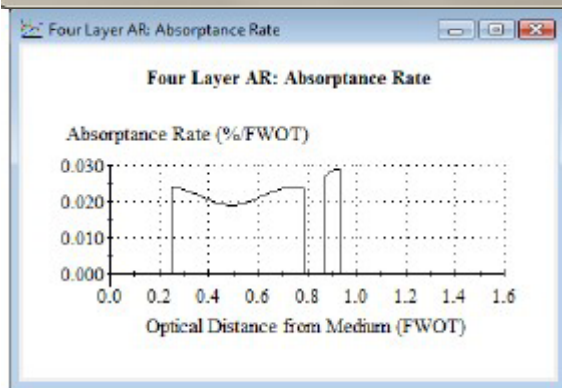
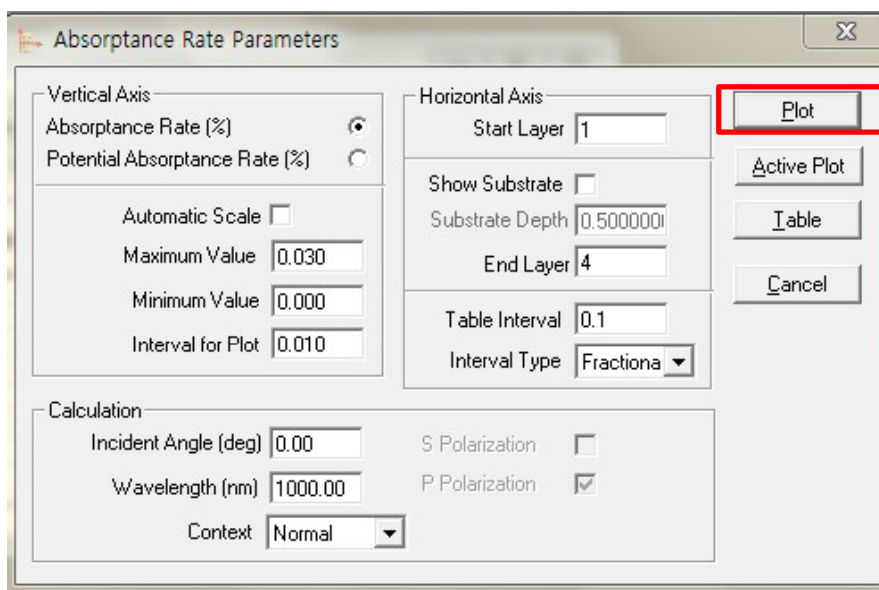
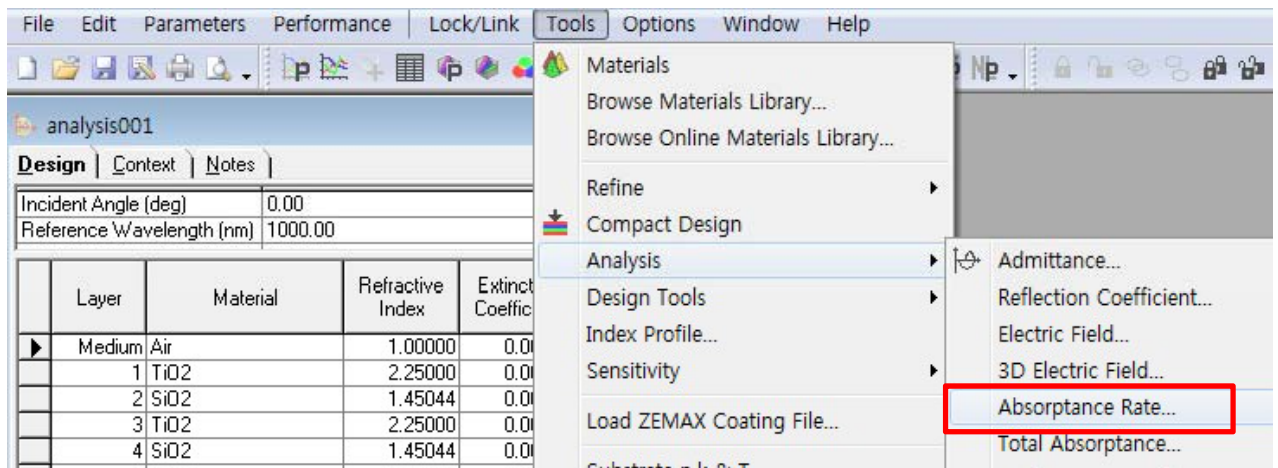
Tools > Analysis > 3D Electric Field...



Y축이 파장인 경우, Z축은 입사각, Y 축이 입사각인 경우 Z축은 파장.

5. Absorptance Rate...

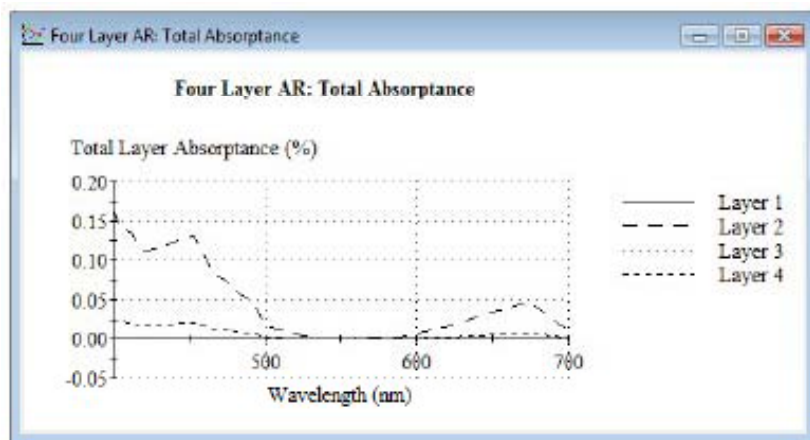
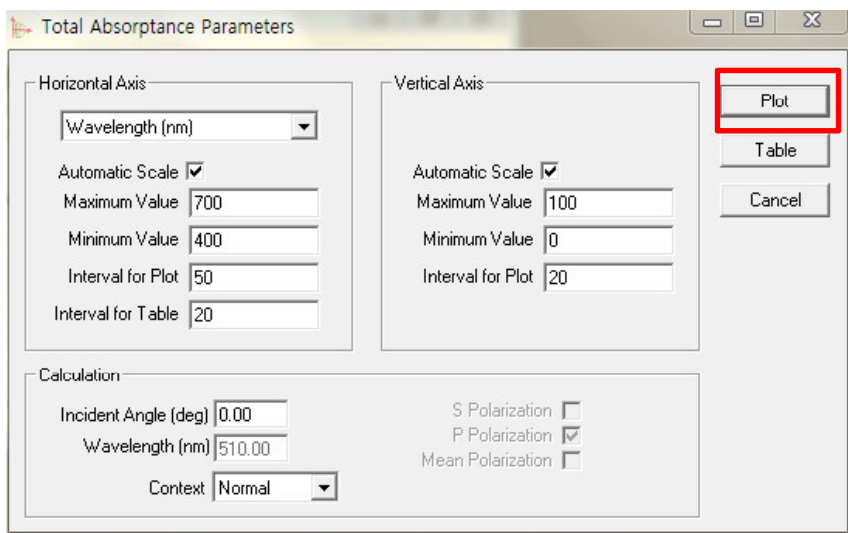
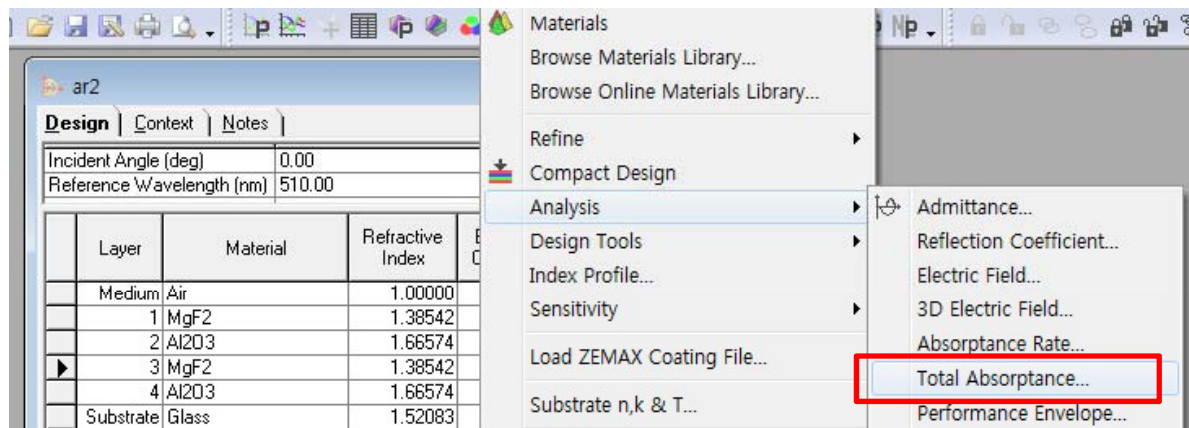
Tools > Analysis > Absorptance Rate...



2개 레이어에 흡수가 있고
다른 3개 레이어는 흡수가 없음을
보여주는 Plot.

6. Total Absorptance...

Tools > Analysis > Total Absorptance ...

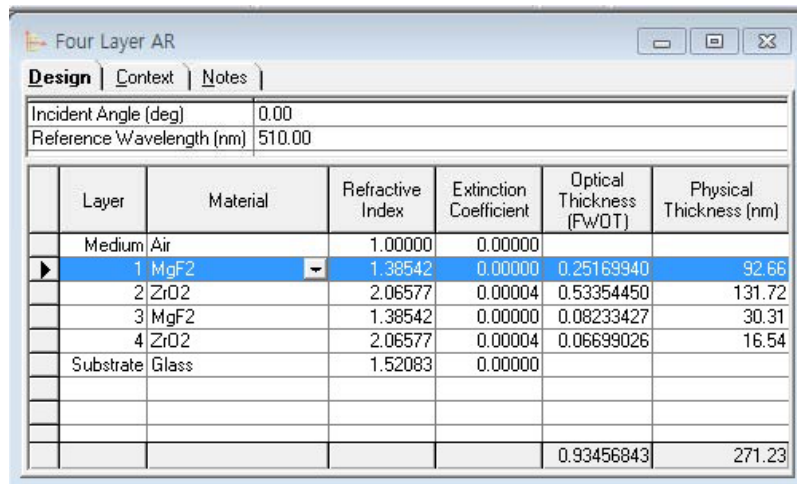


각 Layer별 흡수율 표시,
Layers 1과 3 : 흡수율 무
Layers 2와 4 : 흡수율 유(조금)

7. Performance Envelope

선택된 Layer의 두께 값에 대한 가능한 최대 및 최소 투과율 계산.

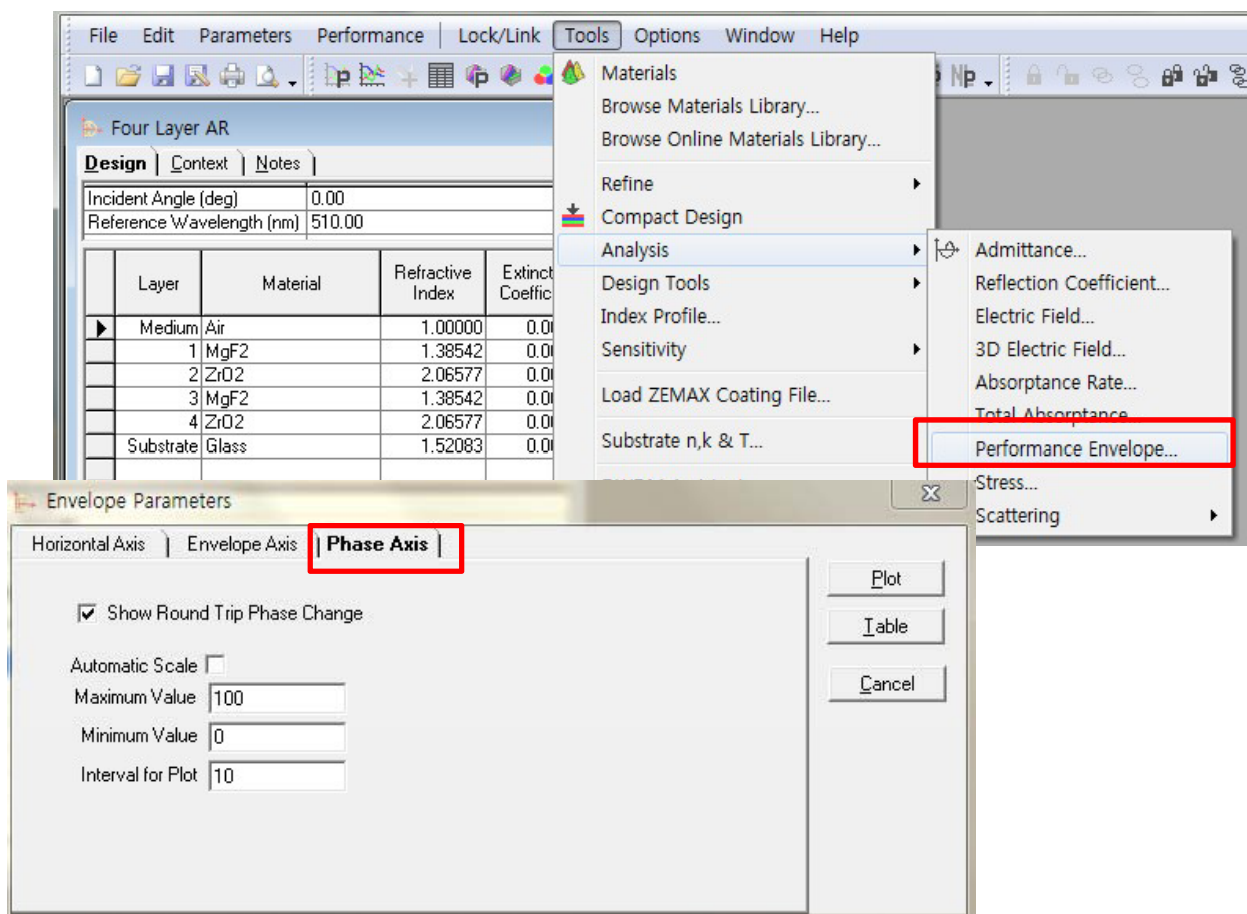
한 Layer를 선택한 후,



The screenshot shows the 'Four Layer AR' window with the 'Design' tab selected. It displays incident angle and reference wavelength settings, and a table of layer properties.

	Layer	Material	Refractive Index	Extinction Coefficient	Optical Thickness (FWOT)	Physical Thickness (nm)
	Medium	Air	1.00000	0.00000		
▶	1	MgF2	1.38542	0.00000	0.25169940	92.66
	2	ZrO2	2.06577	0.00004	0.53354450	131.72
	3	MgF2	1.38542	0.00000	0.08233427	30.31
	4	ZrO2	2.06577	0.00004	0.06699026	16.54
	Substrate	Glass	1.52083	0.00000		
					0.93456843	271.23

Tools > Analysis > Performance Envelope ...



Envelope Parameters

Horizontal Axis | **Envelope Axis** | Phase Axis

☒ Show Envelope

Automatic Scale ☒

Maximum Value

Minimum Value

Interval for Plot

Plot
Table
Cancel

Envelope Parameters

Horizontal Axis | Envelope Axis | Phase Axis

Wavelength (nm)

Automatic Scale ☒

Maximum Value

Minimum Value

Interval for Plot

Interval for Table

Context

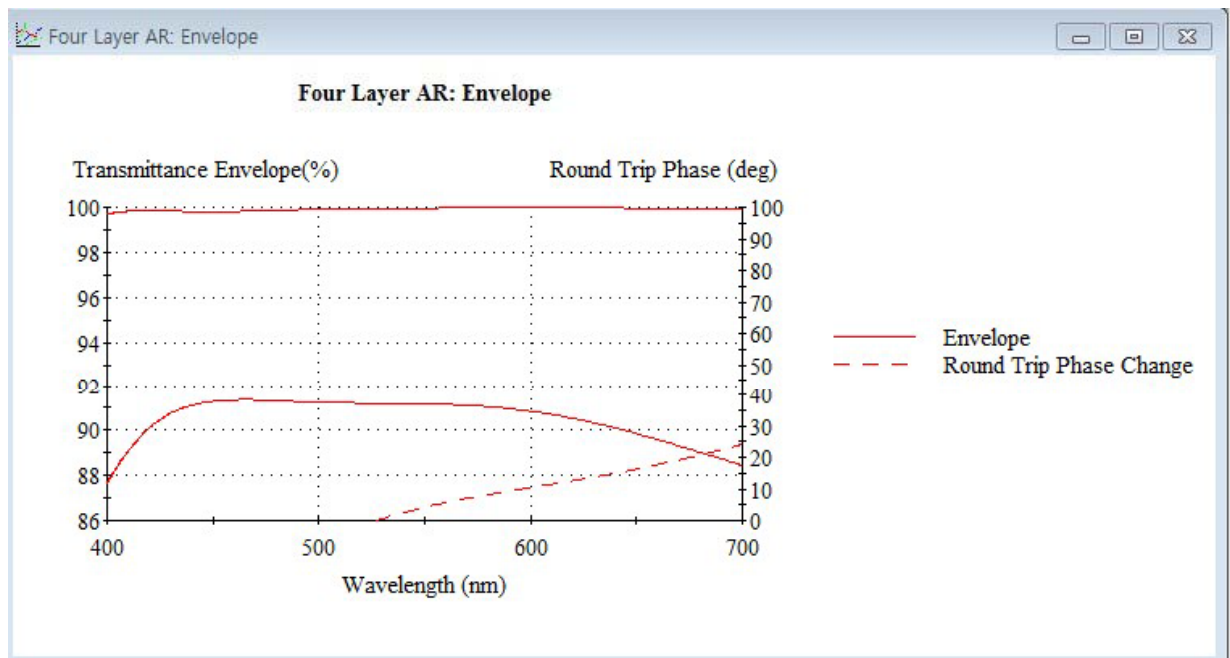
Incident Angle (deg)

Wavelength (nm)

Temperature Offset (deg C)

Polarization
P ☐ S ☒ Mean ☐

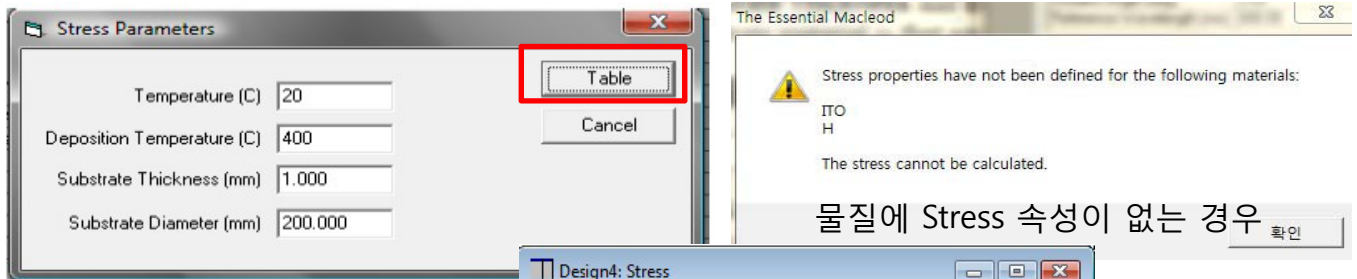
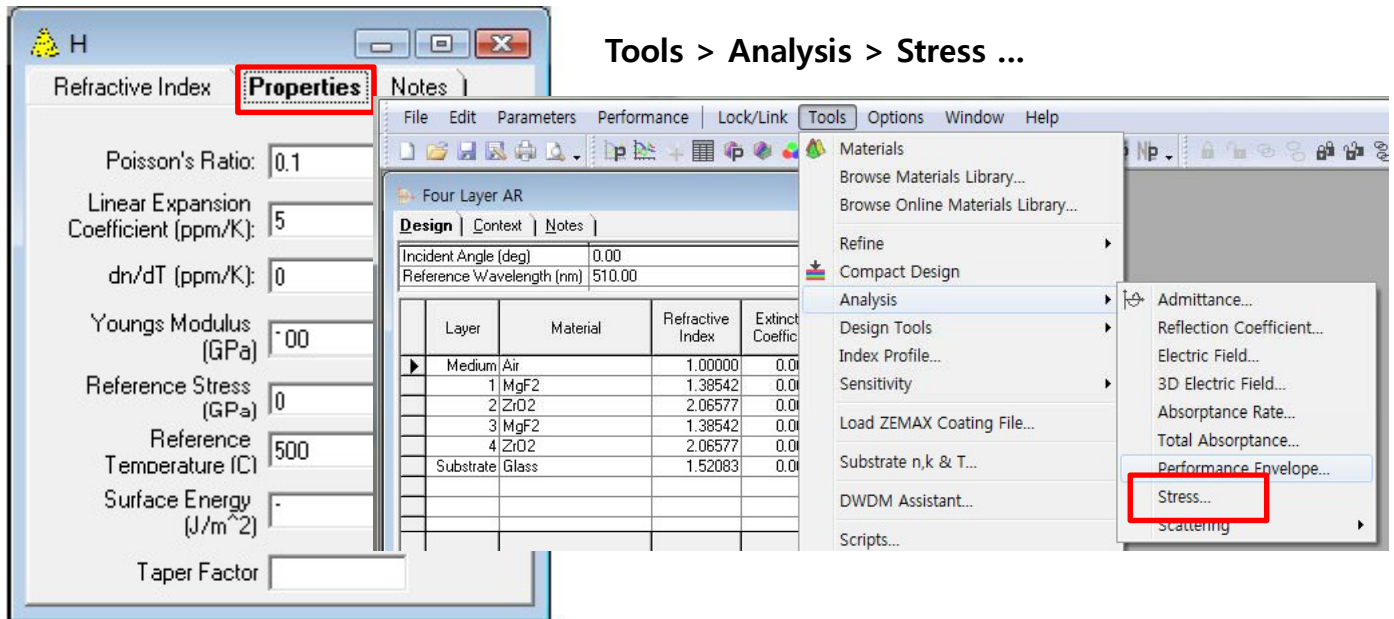
Plot
Table
Cancel



8. Stress

예측 매우 간단한 thermal model을 기준으로한 stress and strain levels 예측 툴.

이 툴을 사용하기 앞서 Layer Materials와 Substrate에 대한 thermo-mechanical 속성을 Materials data에서 "Properties"로 확인이 가능 합니다.



상세 내용은 한글 매뉴얼
"12. Stress," 참고 하세요.

Design4: Stress					
Table		Notes			
▶	Design	Design4			
	Temperature (C)	20			
	Deposition Temperature (C)	400			
	Substrate Thickness (mm)	1			
	Substrate Diameter (mm)	200			
	Total Strain Energy (J/m^2)	2.11			
	Radius of Curvature (m)	-35.4			
	Deflection (mm)	-0.00141			
	Cracking Parameter	1.05			
*					

	Layer Number	Stress (GPa)	Strain Energy (J/m^2)	Delamination Factor	Maximum Shear Stress GPa
	1	0.224	0.0567	0.0283	0.915
	2	1.23	0.969	0.513	8.07
	3	0.224	0.0567	0.541	8.99
	4	1.23	0.969	0.03	16.1
▶	5	0.224	0.0567	0.05	17.1

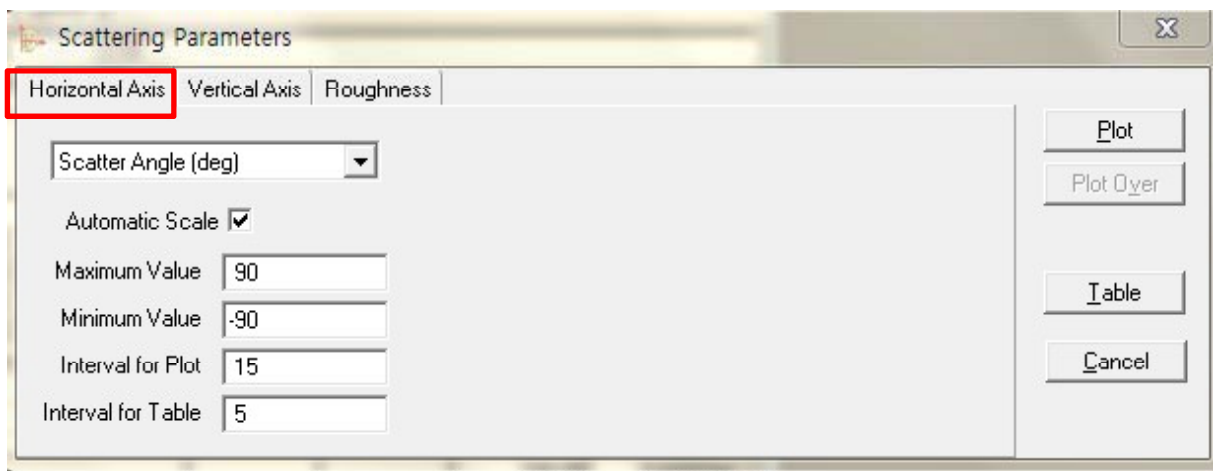
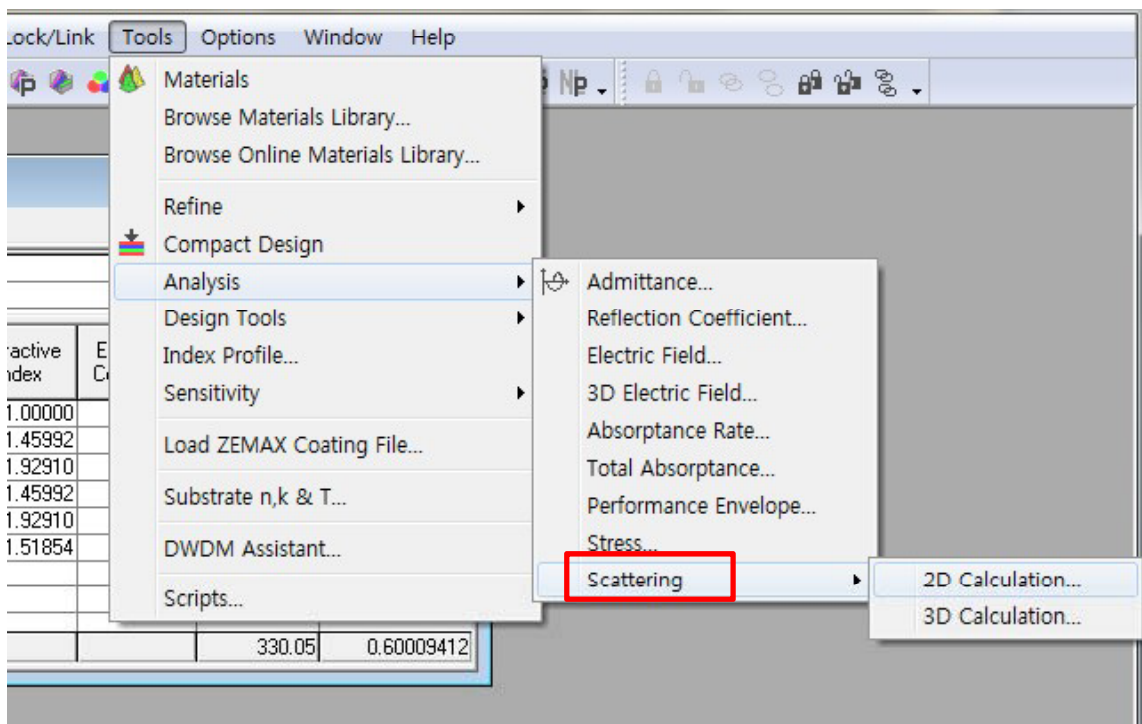
9. Scattering

코팅으로 산란 된 빛을 예측하는 Tool.

2d calculation : 단 변수의 함수로 산란 예측.

3d calculation : 두 변수의 함수로 산란 예측.

Tools > Analysis > Scattering ...



Scattering Parameters

Horizontal Axis | **Vertical Axis** | Roughness

Log(Transmitted ARS) ▼

Automatic Scale ☒ Polarization P → P ☐ Add to Label

Maximum Value 0 Context: Normal ☐ Add to Label

Minimum Value -10 Incident Angle (deg) 45 ☐ Add to Label

Interval for Plot 1 Wavelength (nm) 600.00 ☐ Add to Label

Scatter Angle (deg) 0.00 ☐ Add to Label

Plot Plot Over Table Cancel

Scattering Parameters

Horizontal Axis | Vertical Axis | **Roughness**

Long Range RMS Roughness (nm) 0.5

Long Range Correlation Length (nm) 2000

Short Range RMS Roughness (nm) 0.49

Short Range Correlation Length (nm) 200

Plot Plot Over Table Cancel

