## Modeling Diffuse Plastic in LightTools

Authors

Introduction

Measuring the Scattering Properties of Plastic Materials



Figure 1: Samples for Evonik ACRYLITE Satinice DF23 (left) and ALBIS ALCOM PC 744/4 UV CC1063-11LD (right) that can be used for scattering measurements



Figure 3: The User Material dialog box after a new material has been added



Figure 4: The initial state of the DiffusePlastic material

Models for Refractive Index and Dispersion

Name	Formula
Constant	
Index Interpolation	Set of wavelength-index pairs:
Cauchy	
Hartmann	
Sellmeier	

Glass Manufacturer's Sellmeier

User Material	
NT Cross 20% State and a the state	an 12 mil defensive an aeroka ar
air 🕹	Material Type
DiffusePlastic	Homogeneous
	🔘 Gradient
idex 🗸	Refractive Index Type Constant I
ex	Absorption Type Cauchy In
	Willing Scattering
Add Particle	
The second se	
	15 dF
	I III SUL BERLE

Figure 5: Refractive index types available for homogeneous materials



Figure 6: The Glass-Manufacturer's Sellmeier coefficients as entered from the Szczurowski 2013 data



Figure 10: The list of available particle types



Figure 12: The available controls for a Mie particle



Figure 13: Material properties for the particles can be specified by entering the refractive index or by selecting an existing material

	······	······			<b>1</b> 7 a.
User Material	Constant Index	Optical Density Optica	I Density Evaluat	or + -	
Mater		TiO2	● - omoge ○ Gradient	ineous t	<mark>â</mark> air R n:œni- s'
· ·		6665763	n	าวสี่ว <del>ลายน</del> องไป	Zanatank Indan
~		Absorption	Туре	Optical Density	
		Volume	Scattering		
		Add	Particle	Import Particle	
		🗌 Calcu	ulate Particle Num	nber Density	
		Matrix D	ensity [		mg/mm^3
		Material Dis		TiO 2	
		Material De	scription	102	

User Material*		
+	Controls Mie Particle Size	
air	Enable	
DiffuseRlastic	Patticle:Number:Density	1000.0 1/mm <sup>2</sup>
TiO2	Calculate Particle Number Density -	
	By Molume-Reformation	%
	O By Waight Recentage	%
	Density of Particles	mg/mr
	Angular Resolution	5.0000 degrees
100	C (Hear Spanified lodey	
	Real. 1.5440	Imaginary 0.00
	Use Index Definition from Mate	rial
	Oatalog USER	✓ Glass Map
	Material air	✓
	air Dianaistissen Diarragiostica	
	New Dele	ete Particles Export Particles

Figure 15: Once the particle's material has been created, it can be selected from the USER catalog

RCTCOGVGTU HQT VJKU GZCORNG ;QW ECP WUG C URTGCFUJGGV G I 'ZEGN VQ CPF YJQUG UVCPFCTF FGXKCVKQP Ä KU PO WUKPI VJG HQNNQYKPI GSWCVKQP





Figure 18: The density of the base material is entered on the User Material tab



Figure 19: The density of the particles is entered on the Controls tab of the particle

User Material	_			
+ -	Controls Mie	Particle Size		
air ▲ TiO2	Enable	tan a		⊶ ° ≈¶∭["'*
alculate Particle Number Density			🗄 🕒 Mie1	_   <b>  '</b> -0
) By Volume Percentage	0.01	%		
) By Weight Percentage	0.05	%		
ensity of Particles	4.2300	mg/mm^3		C

Figure 20: The concentration of the particles in this example is entered as a By Weight Percentage of 0.05%

User Material		д×
+ -	Mie Evaluation Mie Evaluator	Chart
air 🔒	Wavelength	550.00 mm
6e:007 mm^2* "	art (2) ∎ - ¥ Diffuss¥astic	Sidatter Cross Section 7 5.44
82e-013 mm^2	- O Mix	Absorption Cross Section 1.6
	Mean Free Rath	0.73478 mm

