Reflective Materials

Materials

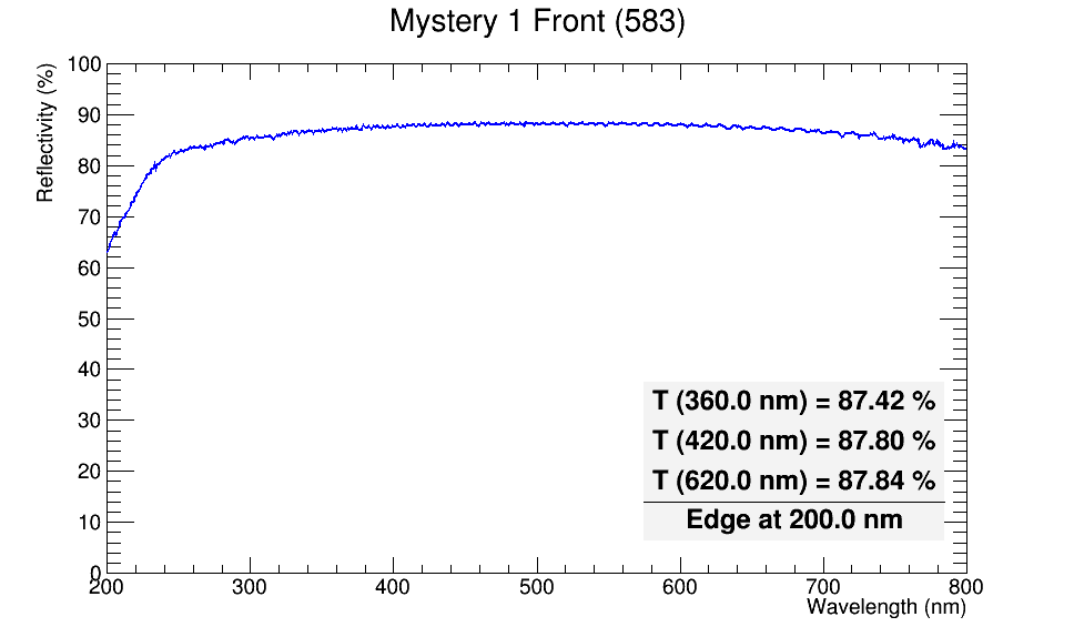
Mystery Material #1

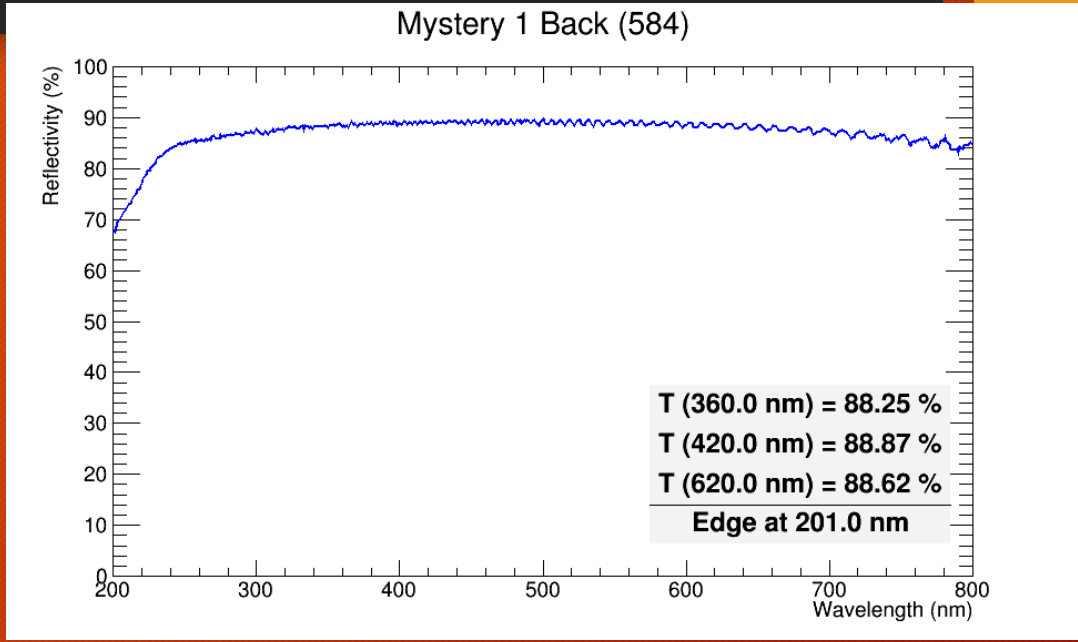
Mystery Material #2

Mystery Material #3

Teflon Tape

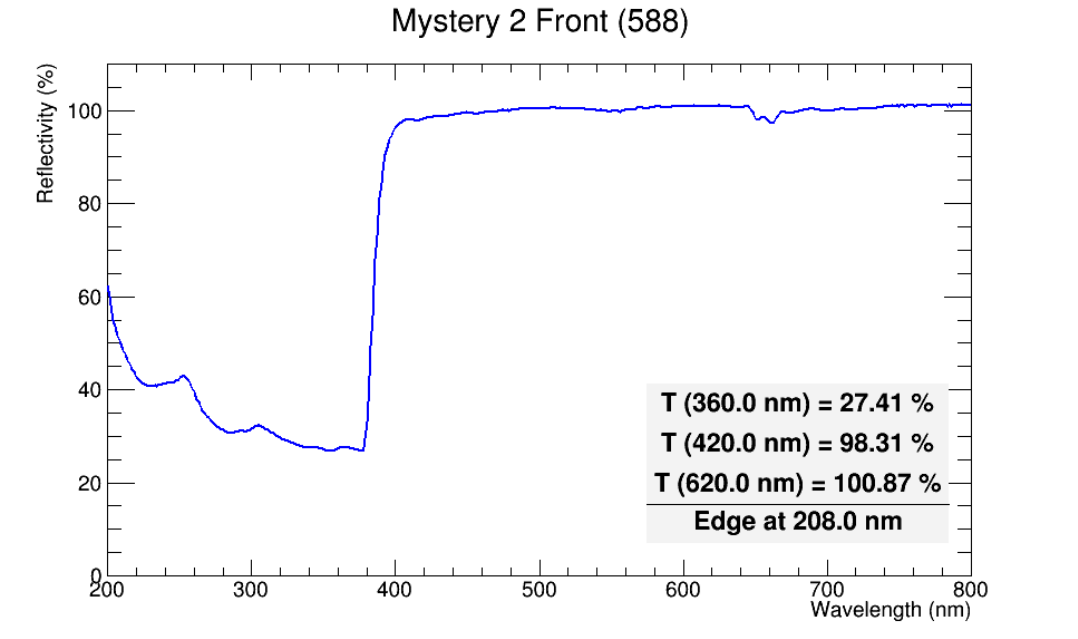
Mystery 1

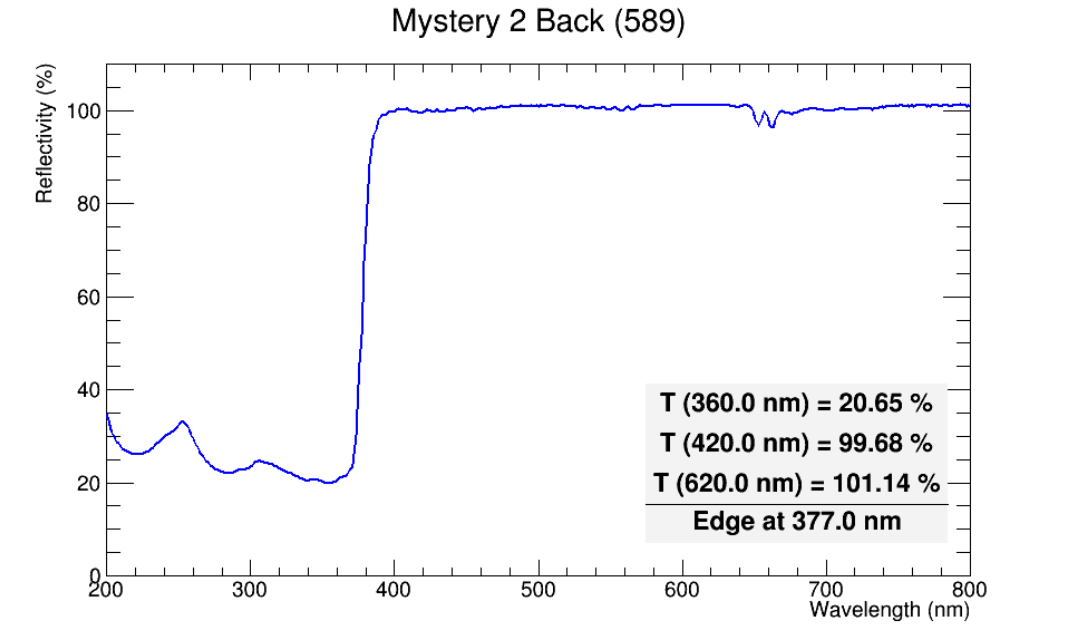




Mystery 1				
	Reflectivity(%)			
Wavelength (nm)	Front	Back	2 Layers	3 Layers
360	87.42	88.25	87.87	88.57
420	87.8	88.87	88.47	88.94
620	87.84	88.62	88.09	88.44

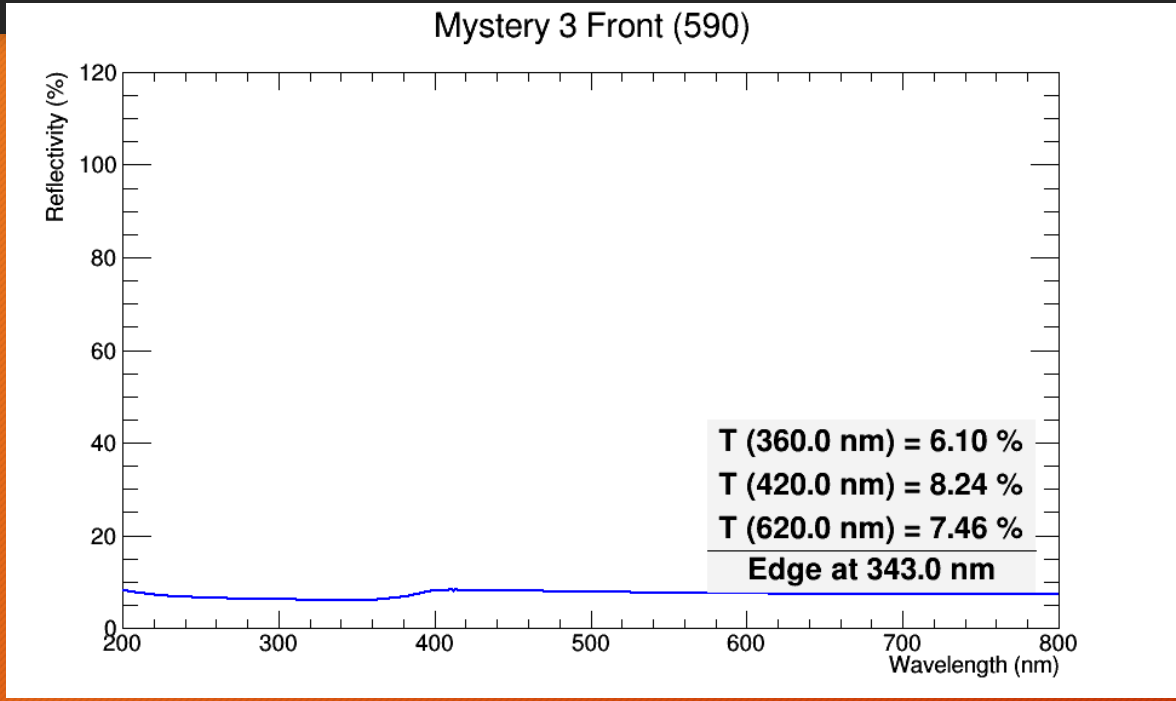
Mystery 2

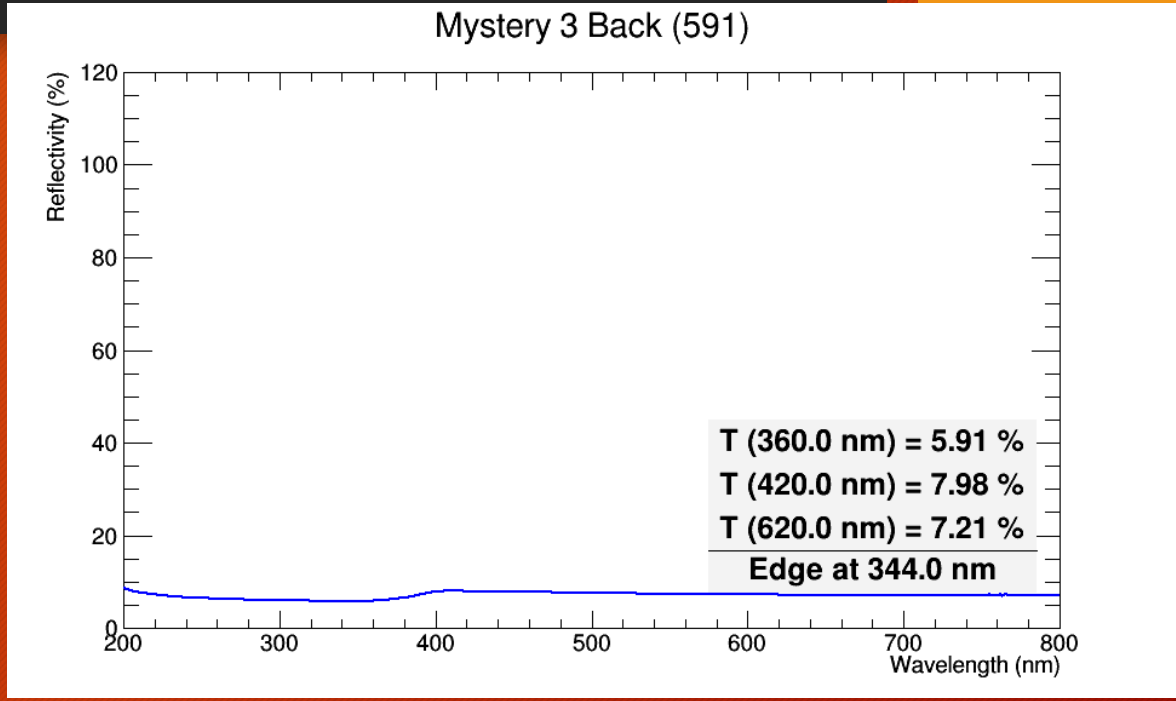




Mystery 2				
Wavelength (nm)	Reflectivity(%)			
	Front	Back	2 Layers	3 Layers
360	27.41	20.65		
420	98.31	99.68		
620	100.87	101.14		

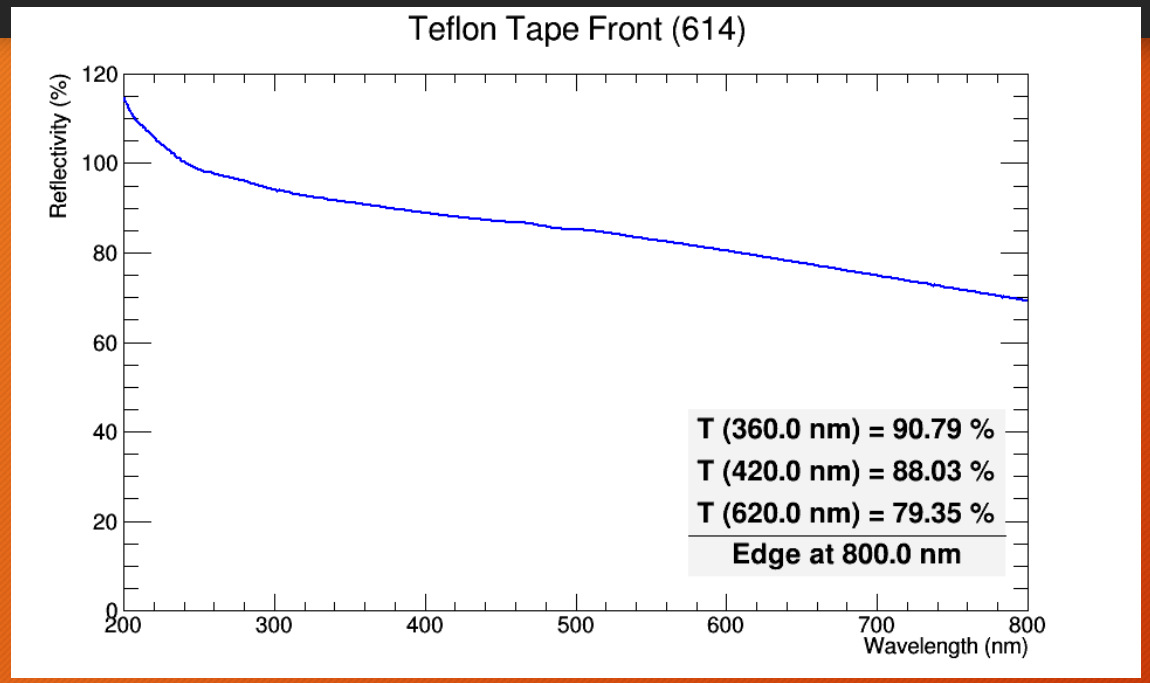
Mystery 3

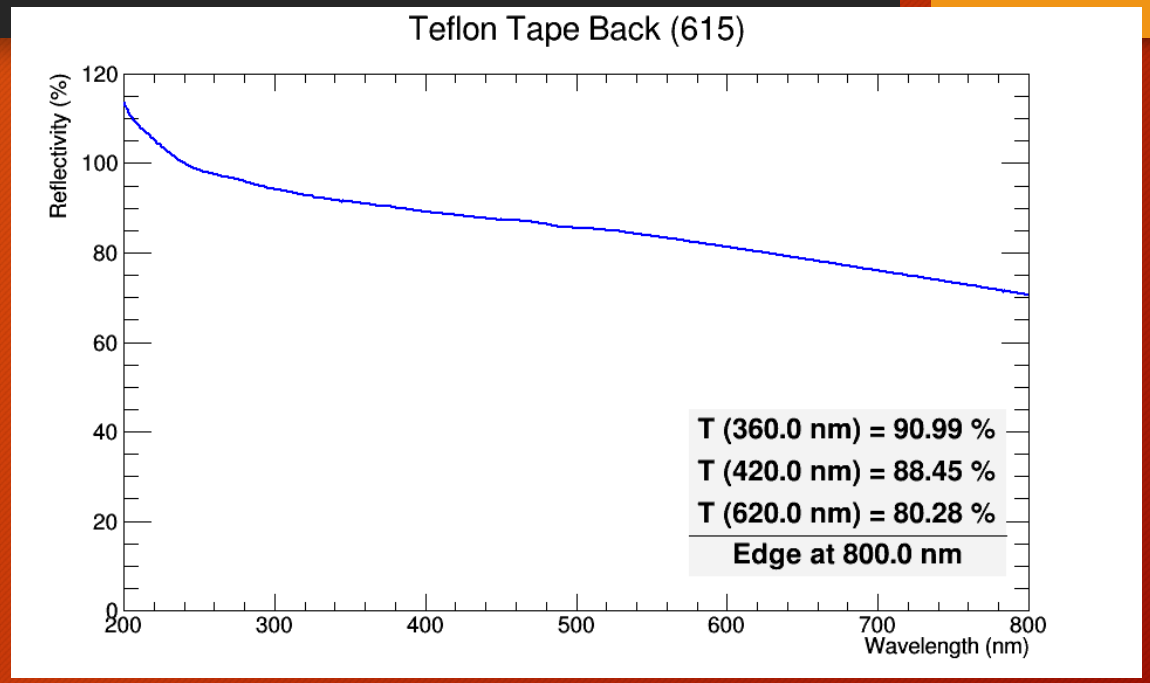




Mystery 3				
	Reflectivity(%)			
Wavelength (nm)	Front	Back	2 Layers	3 Layers
360	6.1	5.91	6.08	6
420	8.24	7.98	8.21	8.11
620	7.46	7.21	7.45	7.35

Teflon Tape





Teflon Tape				
Wavelength (nm)	Reflectivity(%)			
	Front	Back	2 Layers	3 Layers
360	90.79	90.99	95.36	97.47
420	88.03	88.45	93.41	95.96
620	79.35	80.28	87.53	91.71

Set Up

- Mystery reflectors were cut into 9.5 cm x 20 cm rectangles, and wrapped around the crystal once
- On top of the single layer of reflector, I wrapped two layers of electrical tape.
- The set up pictured was used to apply optical grease so that a consistent amount is used in each trial.
- The test was run for 20 min (>50,000 events)
- The tests with the new reflectors were then compared to tests run on the same crystal with 3 layers of Teflon Tape

Light Yield (pe/MeV)

Mystery 1

J24			
Run #	Material	Light Yield	Unc
3722	TT	14.51	0.82
3726	M1	9.52	0.58
3727	TT	15.50	0.76
Average TT		15.01	
Average M1		9.52	
LY Difference		-5.48	
J32			
3736	TT	14.36	0.70
3739	M1	9.05	0.36
3742	M1	10.57	0.31
Average TT		14.36	
Average M1		9.81	
LY Difference		-4.55	
Average LY Difference		-5.01	

Mystery 2

J32			
Run #	Material	Light Yield	Unc
3725	M2	12.78	0.39
3230	M2	11.83	0.49
3232	TT	14.80	0.35
3234	TT	12.93	0.63
Average TT		13.86	
Average M2		12.30	
LY Difference		-1.56	
J24			
3737	TT	14.80	0.74
3740	M2	13.22	0.59
3743	M2	16.50	0.58
Average TT		14.80	
Average M2		14.86	
LY Difference		0.06	
Average LY Difference		-0.75	

Mystery 3

J42			
Run #	Material	Light Yield	Unc
3728	TT	11.32	0.49
3729	TT	11.41	0.44
3731	M3	5.45	0.29
3733	TT	11.62	0.46
Average TT		11.45	
Average M3		5.45	
LY Difference		-5.99	

Average Light Yield Difference

Reflector	Light Yield Difference (pe/MeV)
M1	-5.01
M2	-0.75
M3	-5.99

Multiple Layers of Teflon Tape Light Yield

Teflon Tape			
J42			
Run #	Layers	Light Yield	Uncertainty
3728	3	11.3184	0.49072
3729	3	11.4076	0.435398
3733	3	11.6187	0.461922
3738	1	8.57988	0.300668
3741	1	8.86084	0.378762
Average 3 Layer		**11.44823333**	
Average 1 Layer		**8.72036**	

Next

- Continue testing more trials of the different reflectors
- Conduct more tests with different number of layers
- Conduct tests with the crystal covered in two different reflectors to see if the top or bottom half of the crystal is more important