

PbWO₄ Transmissions at $\lambda=370, 420, 500$ and 550 nm

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- We have analyzed Longitudinal and Transverse transmission data measured before irradiation in Idaho and ~30 days after irradiation. All SICCAS crystals (10 from spring 2014 and 5 from December 2014) Transmissions were measured by using Carl Zorn's setup in ARC building.

Longitudinal Transmission

Block\λ	Before Irradiation				About 30 days after Irradiation				
	370	420	500	550	λ= 370	420	500	550	
1	41.2	63.7	69.6	71.0					
2	35.3	60.8	66.0	68.6	➔	36.4	46.6	51.4	55.0 1.5Mrad
3	44.1	66.1	72.4	73.2	➔	53.5	66.4	71.7	73.0 840kRad
4	42.1	65.1	71.1	72.4					
5	40.8	64.4	70.8	72.4					
6	39.0	64.1	70.7	71.7	➔	52.0	65.3	70.4	71.7 840 kRad
7	35.9	64.4	71.0	71.6					
8	42.2	64.5	70.7	71.6	➔	53.7	53.8	69.6	70.7 1.5 MRad
9	40.0	64.5	70.5	71.8	➔	53.2	65.0	69.2	70.2 840 kRad
10	35.3	65.2	71.4	72.0					
11	37.0	60.6	66.7	68.4					
12	56.8	70.9	74.0	74.8					
13	39.2	62.6	68.9	70.2					
14	48.8	65.6	68.2	59.2					
15	44.4	65.6	71.5	72.5					
					λ= 370	420	500	550	
Block #2 after Irradiation and IR+Blue curing:					38.5	48.7	53.0	57.0	

Comments:

- Transmission vary from the block to block, higher spread at lower wavelength. (At $\lambda=370$ nm $T \approx 35-57\%$, while at $\lambda=420$ nm $T \approx 61-71\%$, and at $\lambda=500$ nm $T \approx 66-74\%$).
- Longitudinal Transmission for crystal #14 show unexpected behavior above $\lambda \sim 500$ nm
- Strong effect of radiation degradation have been observed for crystal #2
- 12 hours IR plus 3 hour Blue LED curing does not recovered crystal #2 transmission.

Transverse Transmission

- Transmission in transverse direction (2 cm thickness) has been measured at several distances from the face of the crystals (5, 15, 25, 35, 45 and 55 mm). The presented data are for 5 mm distance from the face of the crystals.

Block\λ	Before Irradiation				About 30 days after Irradiation				
	370	420	500	550	λ= 370	420	500	550	
1	66.3	70.2	73.0	73.7					
2	65.3	68.4	71.2	72.2	➔	59.2	62.6	65.3	67.5 1.5 Mrad
3	68.5	71.7	74.1	74.7	➔	64.7	68.1	71.2	72.1 840 kRad
4	67.7	70.1	72.1	73.0					
5	64.1	68.7	71.0	72.2					
6	100.0	99.9	100.0	100.0	➔	65.6	69.2	72.0	73.6 1.5MRad
7	65.8	69.6	72.2	73.1					
8	69.4	72.3	74.0	74.6	➔	65.6	69.4	72.2	73.6 1.5MRad
9	64.1	68.2	71.3	72.3	➔	58.1	63.0	65.9	67.6 840 kRad
10	65.0	69.8	72.2	73.2					
11	68.6	70.9	72.9	74.0					
12	67.7	71.1	73.5	74.2					
13	65.5	68.8	71.4	72.6	15mm				
14	66.6	69.6	71.9	73.2					
15	67.8	70.6	72.9	73.5					

Comments:

- Transverse transmissions (before irradiation) for the crystal #6 look very strange, more likely there was some mistake in beam positioning or calibration of the device.
- Spread between transverse transmission data for different crystals are much less than it was observed for the longitudinal transmissions.
- Small residual degradation effect (~10%) after ~30 days of irradiation has been observed for the crystals #2, 3, 6, 8 and 9.