

NPS Calorimeter Prototype:
Status 22 May 2014

Lead Glass curing with IR and Blue LEDs:

I took one irradiated lead glass from Bogdan for testing the curing system.

First we used IR curing. 4 LEDs shined into the lead glass, first in longitudinal direction, then in transverse direction from where the lead glass was irradiated. The curing was done ~1 week per each setup. No convincing sign of bleaching was noticed.

Then we switched to Blue LEDs. The lead glass was illuminated from transverse side for 3 hours, with LEDs touching the glass surface (see Fig. 1).

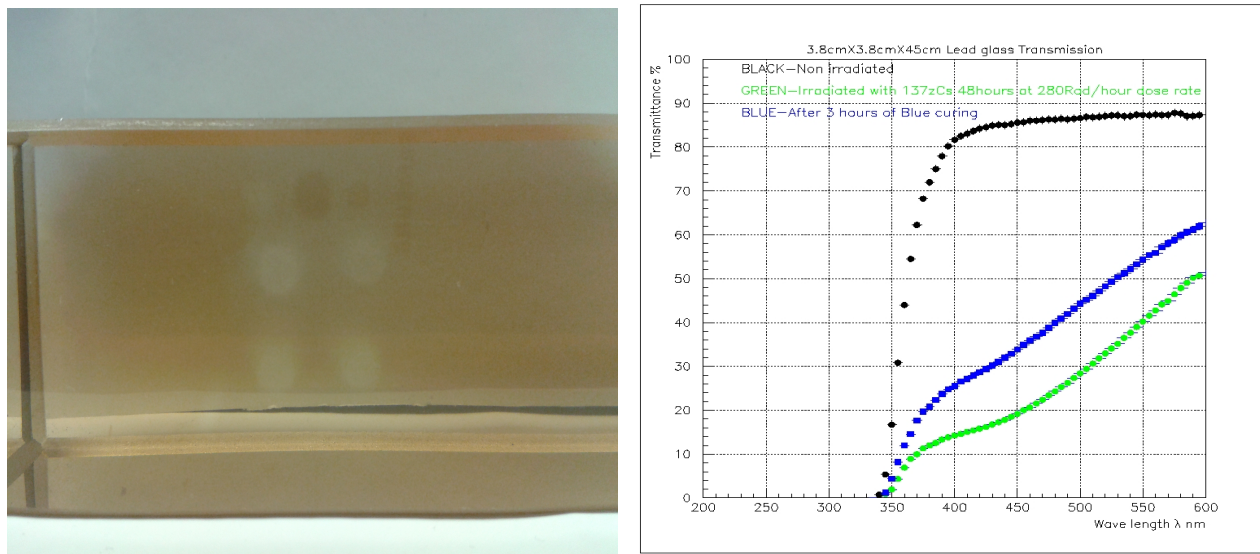


Fig 1. Left: Lead glass block after 3 hours of blue light curing. Right: Lead glass transmission measurement before irradiation (black), after 48 hours of irradiation with ^{137}Cs , with 280Rad/hour dose rate (green), and after 3 hours of curing with blue light (blue).

On the left side picture of Fig. 1 four white spots can be seen, which are places where LEDs touched the lead glass. Note that LEDs' emission angle is only $\sim 10^\circ$. Next, we moved LEDs away from the lead glass for 3 cm, in order to illuminate uniformly a wider area, and left them for overnight curing. Results are shown in Fig. 2.

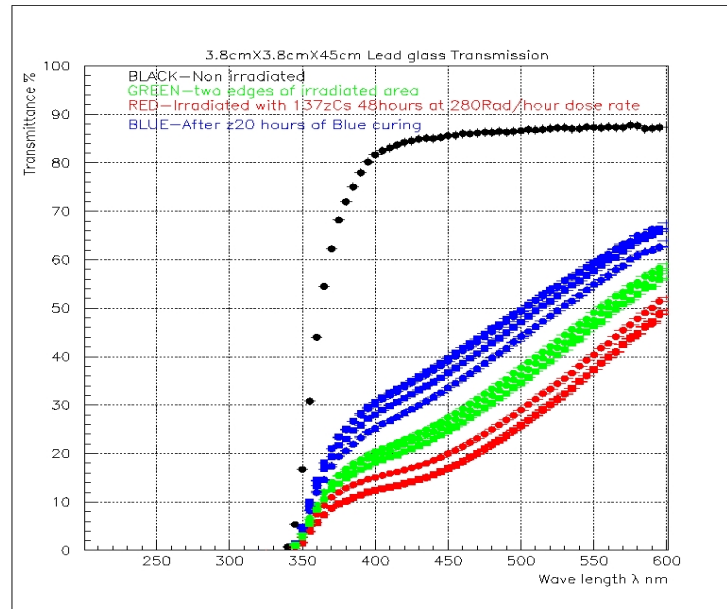


Fig. 2. Results from ~20 hours of curing with blue LEDs. Shown are transmission before irradiation (black), after 48 hours of irradiation with ^{137}Cs source with 280Rad/hour dose rate, around the cured area (at 2 cm, 2.5 cm and 6 cm from the edge of block) (green), and within the cured area (at 3 – 5 cm from the edge of block) (blue).

Still waiting in line for PbWO_4 crystals to be irradiated for 40kRad. RadCon promises to give crystals on upcoming Tuesday, 27 May.

Future proposed activities

- Find a way to disperse LED light, in order to have uniform illumination from all the 4 LEDs on the crystal surface.
- Take from RadCon the radiated crystals
- Measure transmittance of the radiated crystals
- Cure with Blue and IR LEDs PbWO_4 crystals.
- Measure transmittance of all crystals from SICCAS.
- Develop fiber connection scheme of the monitoring system
- Start Prototype assembling (install crystals, PMTs with HV dividers, and the curing system).