

Progress report about PWO production at CRYTUR

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CRYTUR – Turnov, Czech Republic



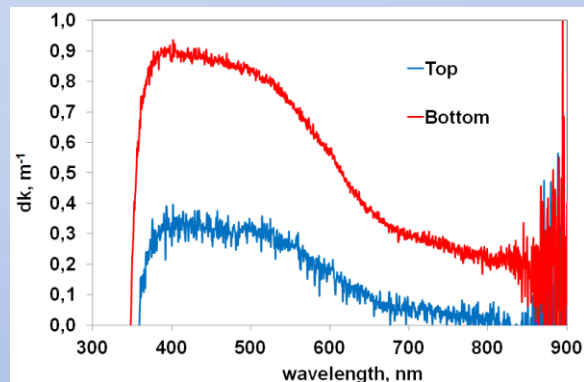
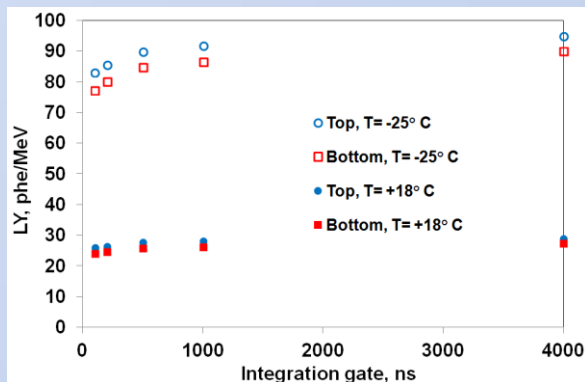
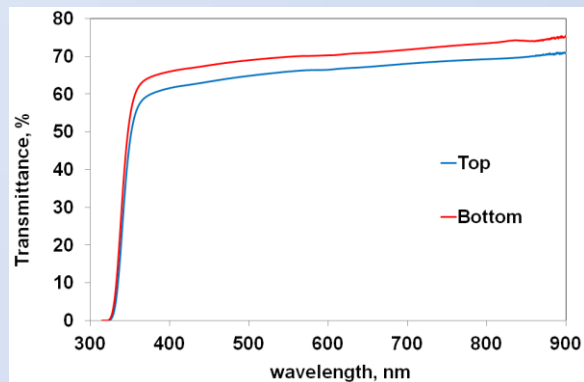
- long tradition in the production of inorganic scintillators
- restart of PWO production in summer 2014
 - production based on Czochralski technology
 - use of existing pre-mixture of raw material (*NeoChem*, Moscow)
 - network: close collaboration with *INP* Minsk and *IPAS* Prague



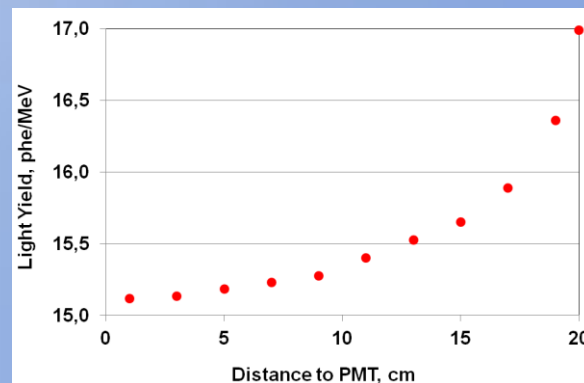
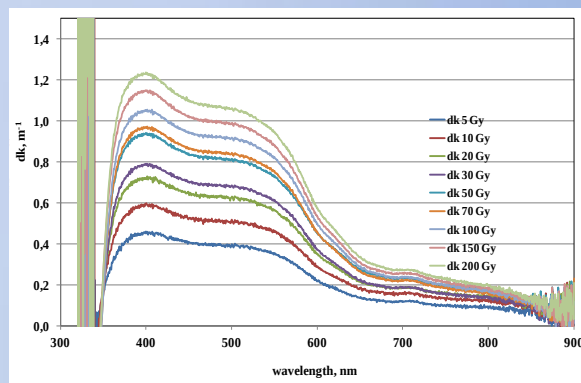
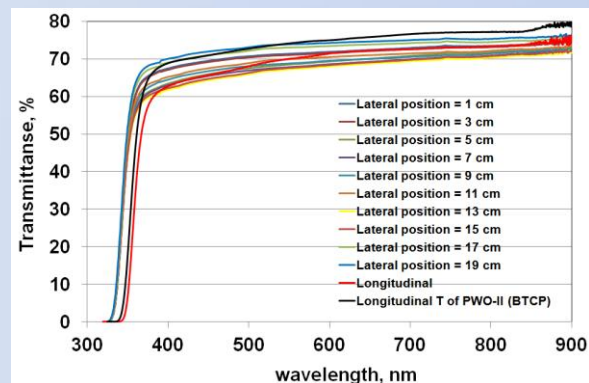
First full size ingots (beginning 2015):



grown in Ar atmosphere and doped with La+Y

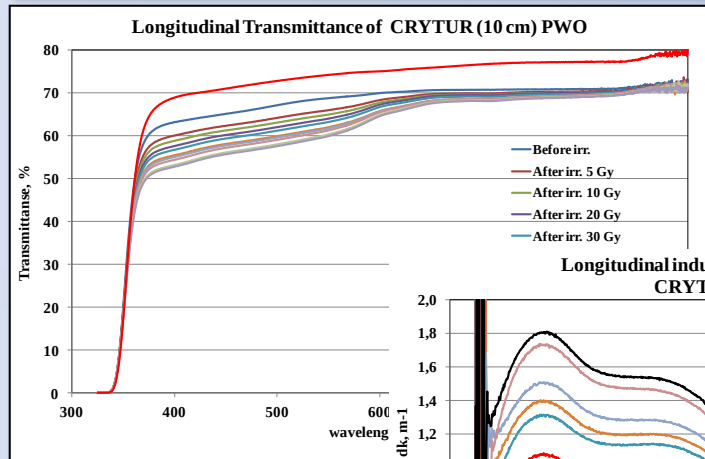
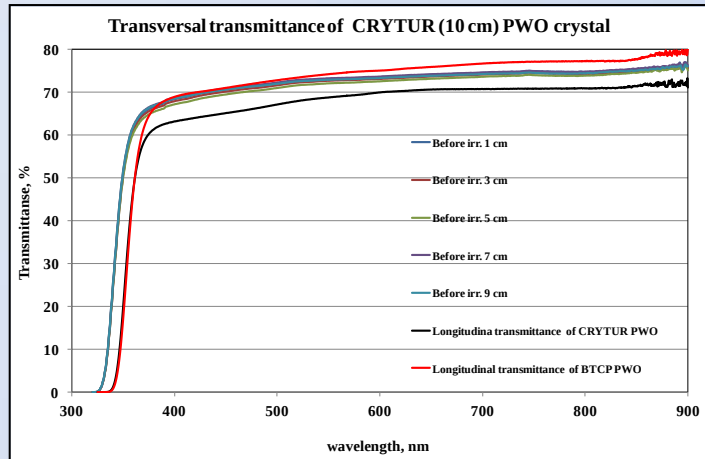


dimension: 20x20x200mm³

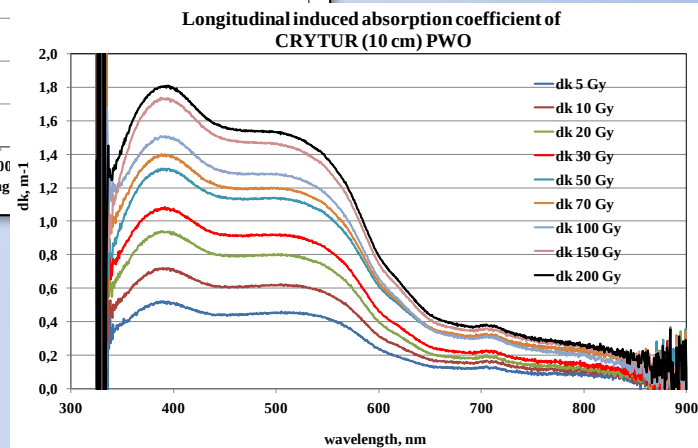


improved sample (summer 2015): no coloring or macro defects

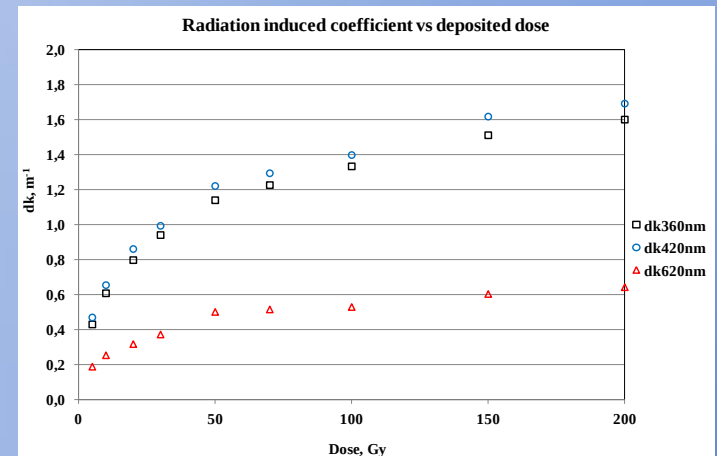
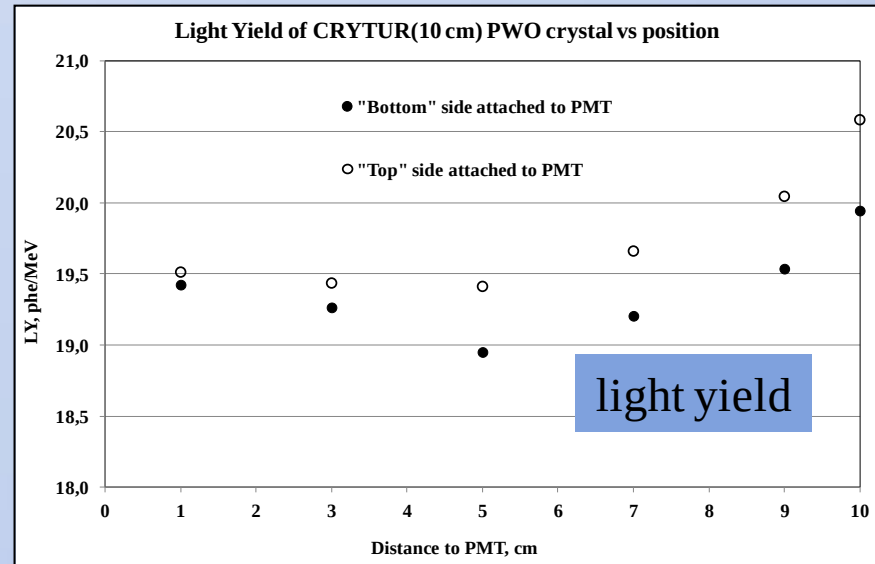
optical transmission and homogeneity



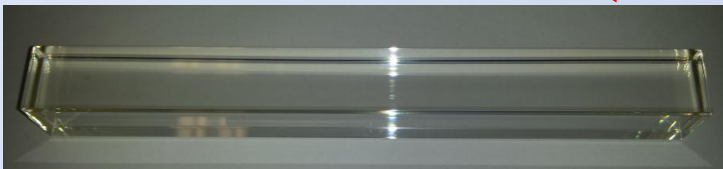
radiation
hardness



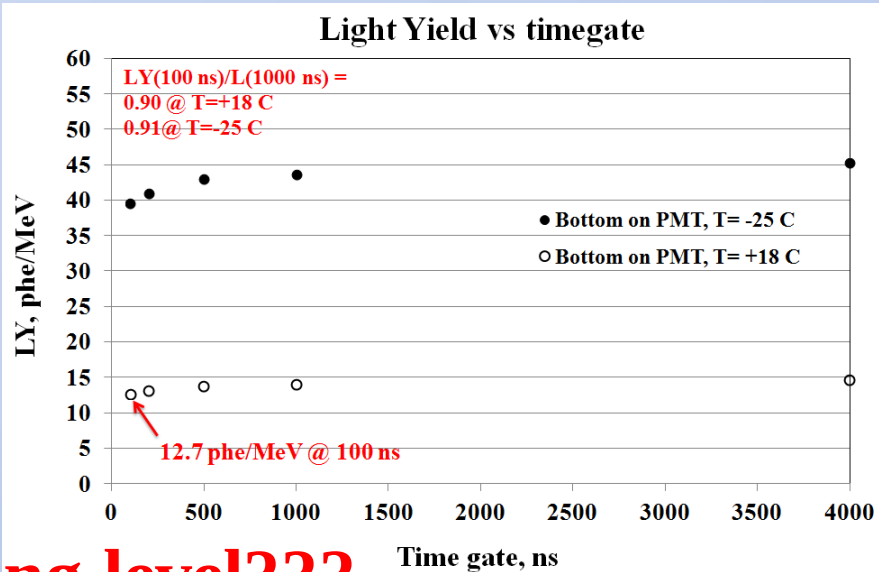
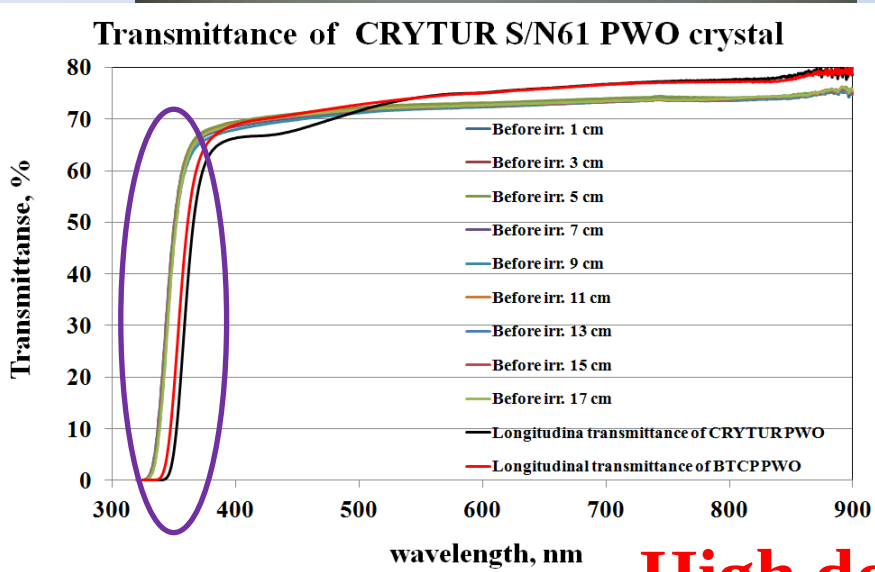
size: 20x20x100 mm³



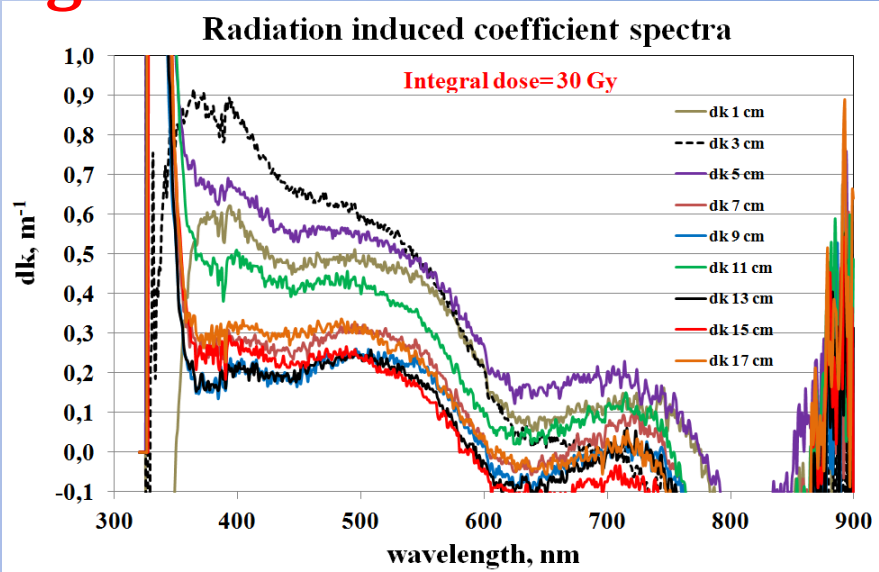
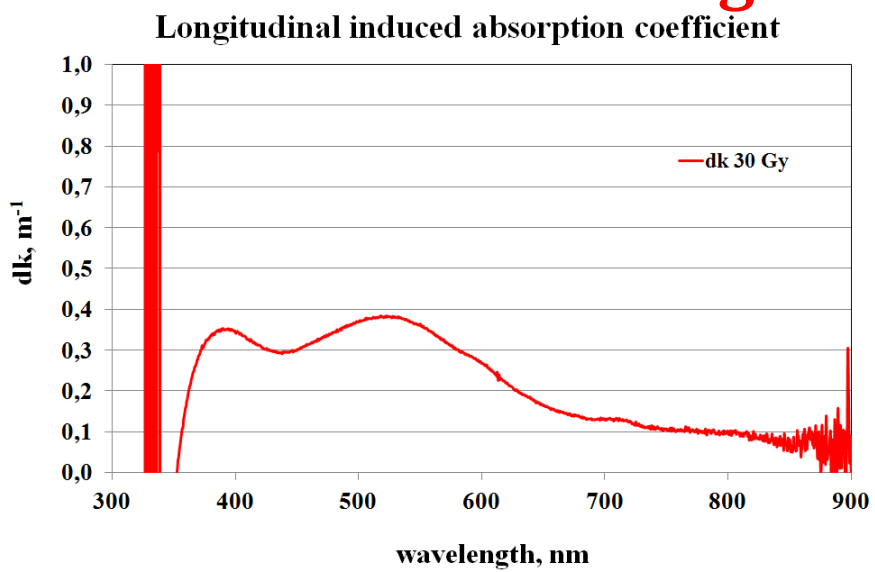
CRYTUR PWO S/N 61 (end 2015)



size: 20x20x185 mm³

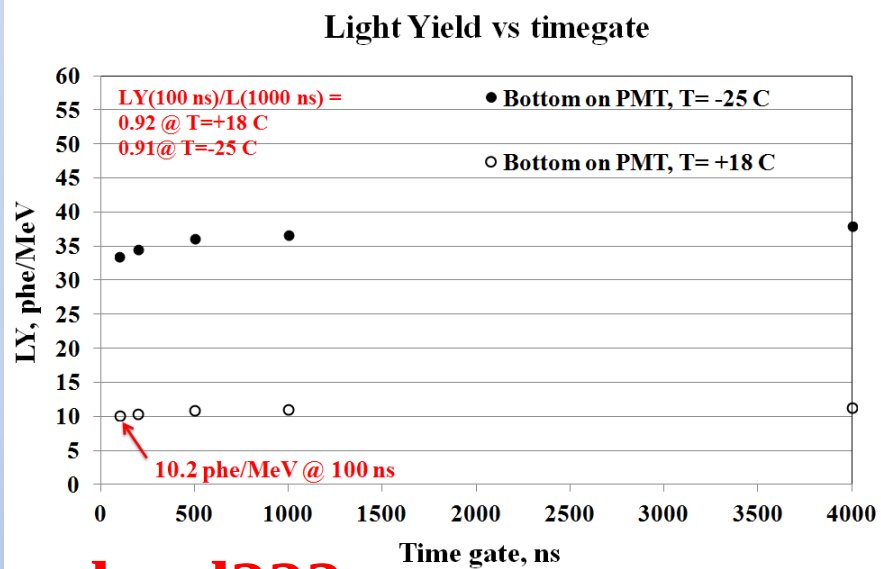
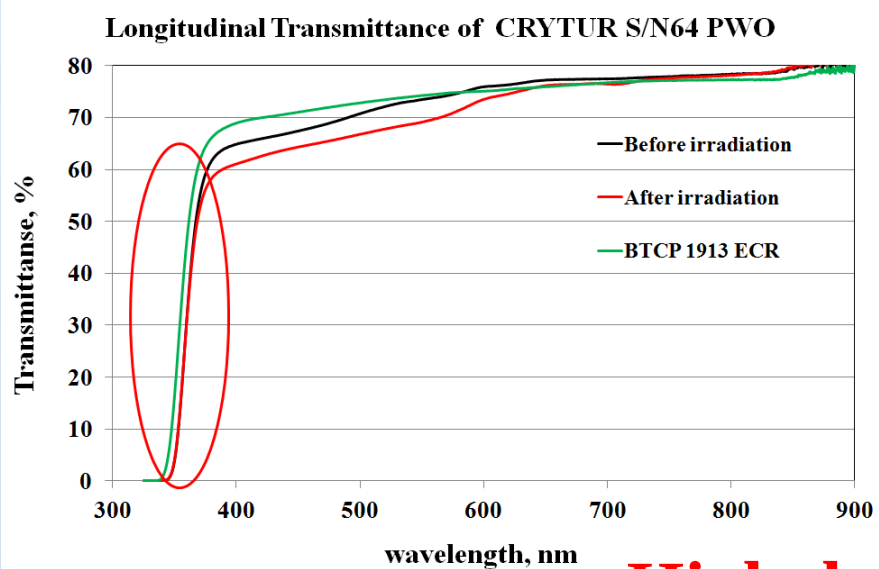


High doping level???

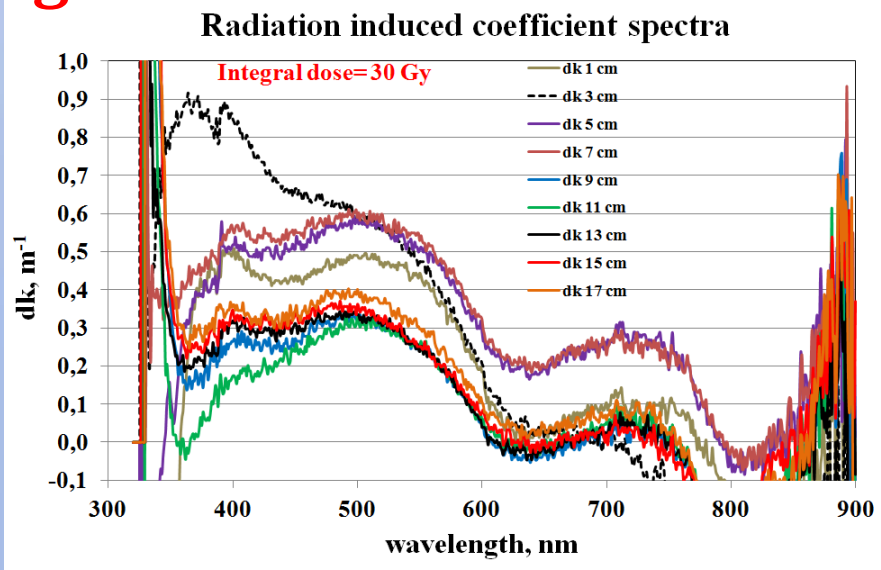
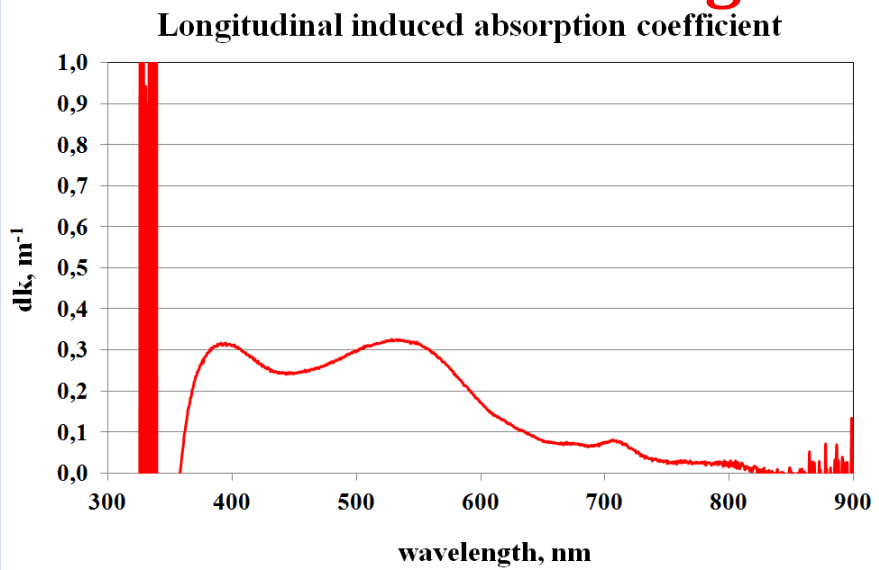


CRYTUR PWO S/N 64 (beginning 2016)

size: 20x20x200 mm³

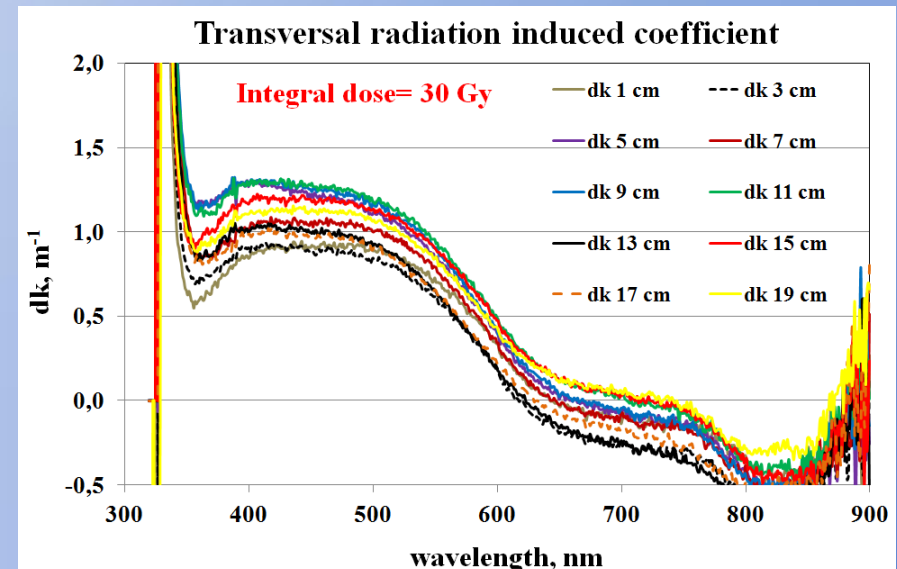
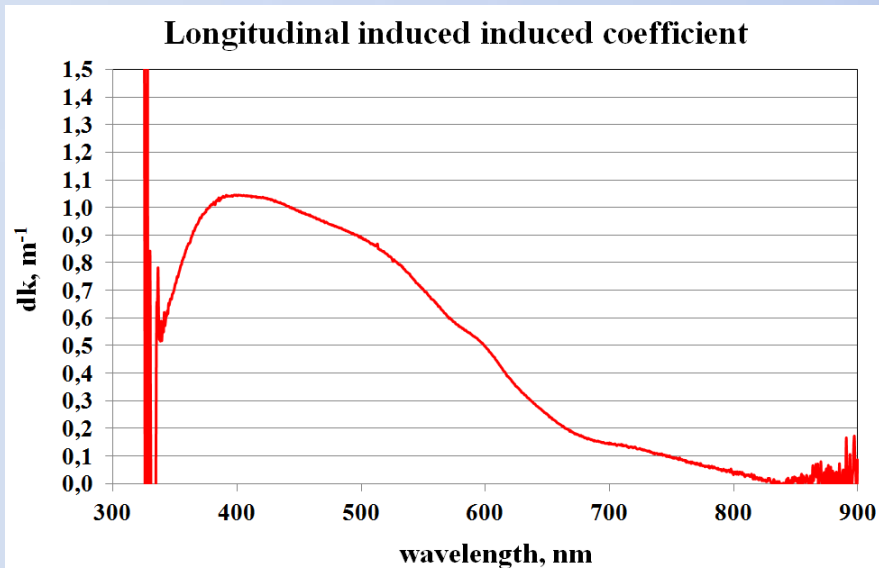
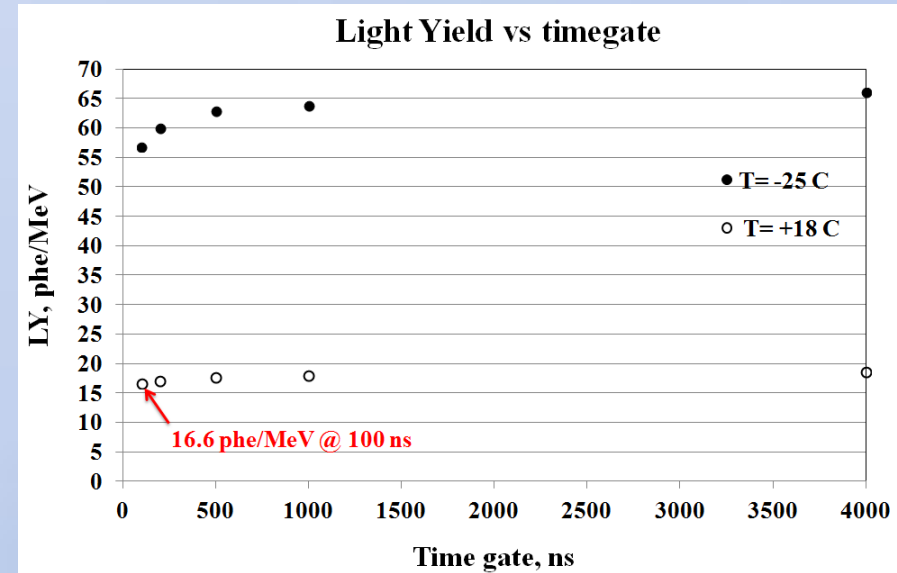
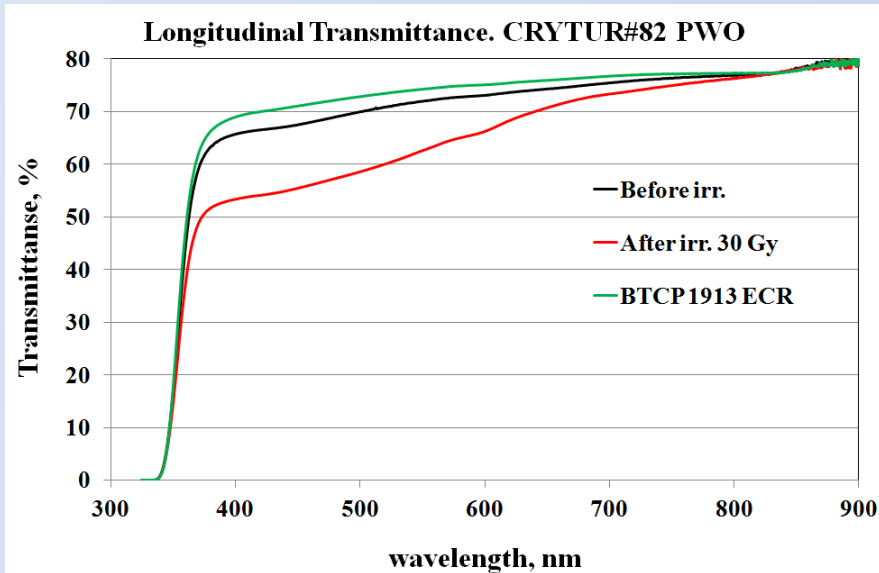


High doping level???



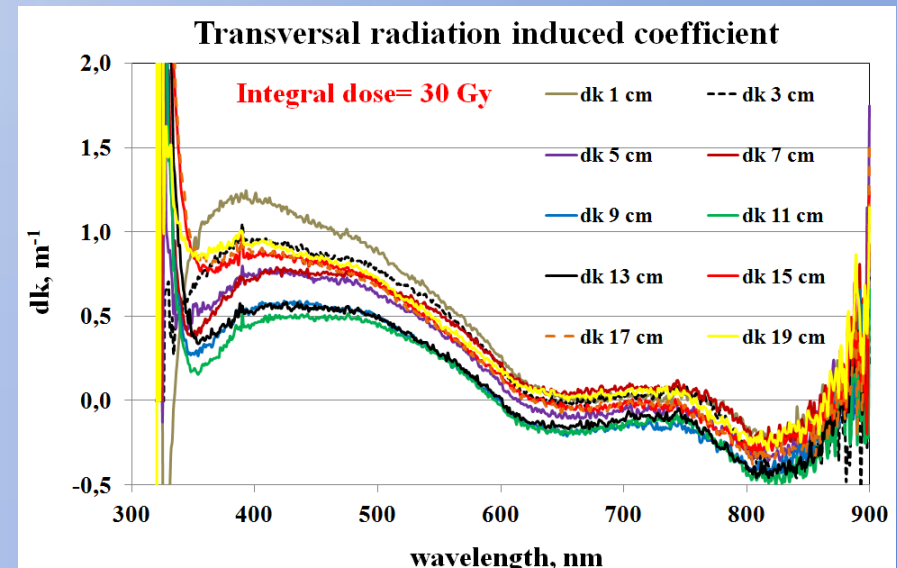
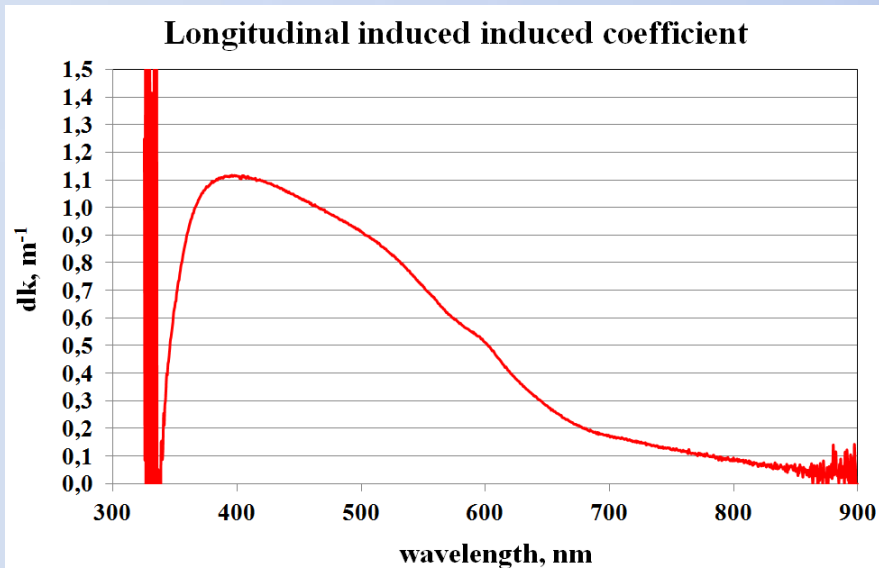
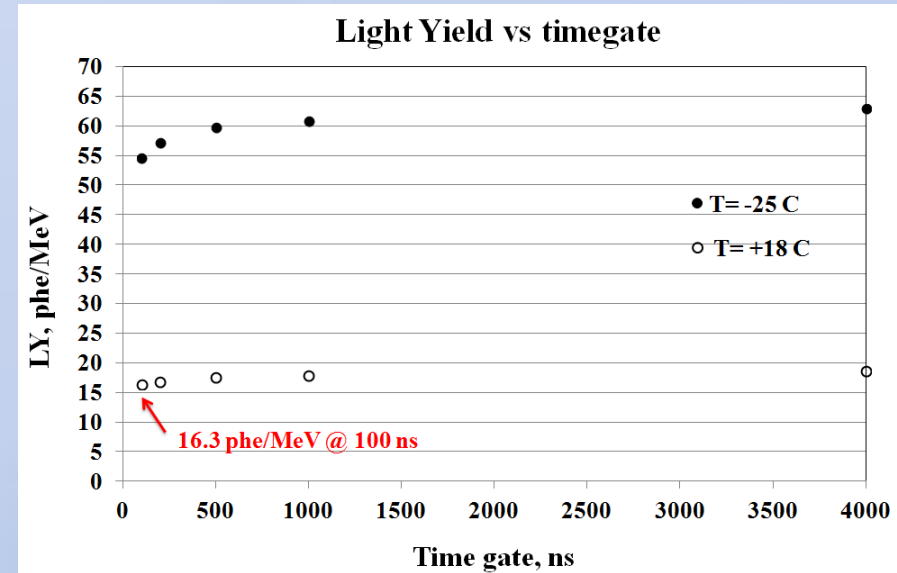
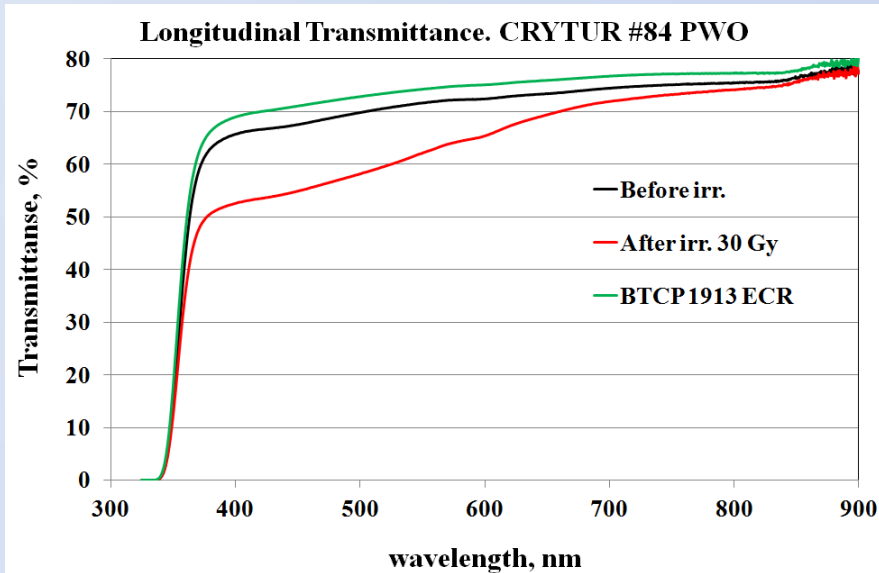
CRYTUR PWO S/N82 (May 2016)

size: 20x20x200 mm³ **Satisfied to PANDA EMC specification**

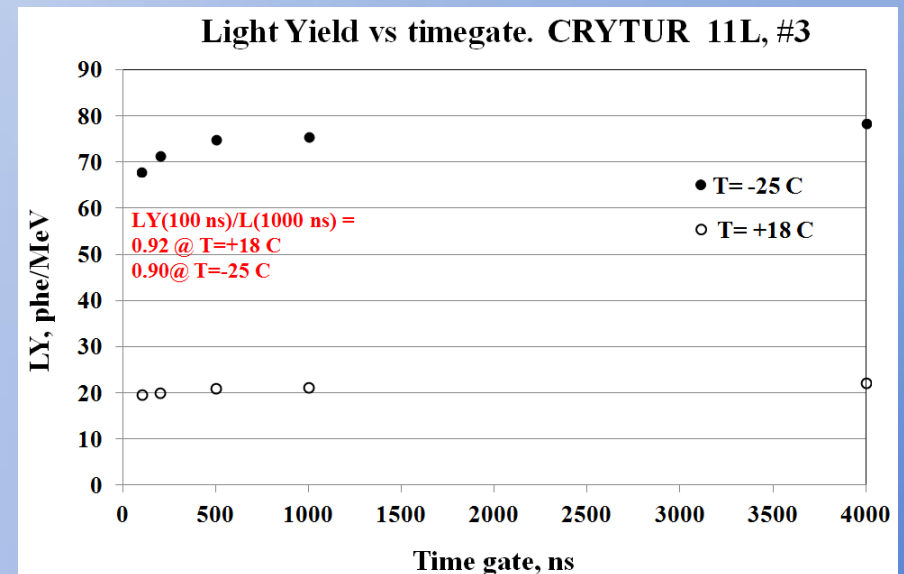
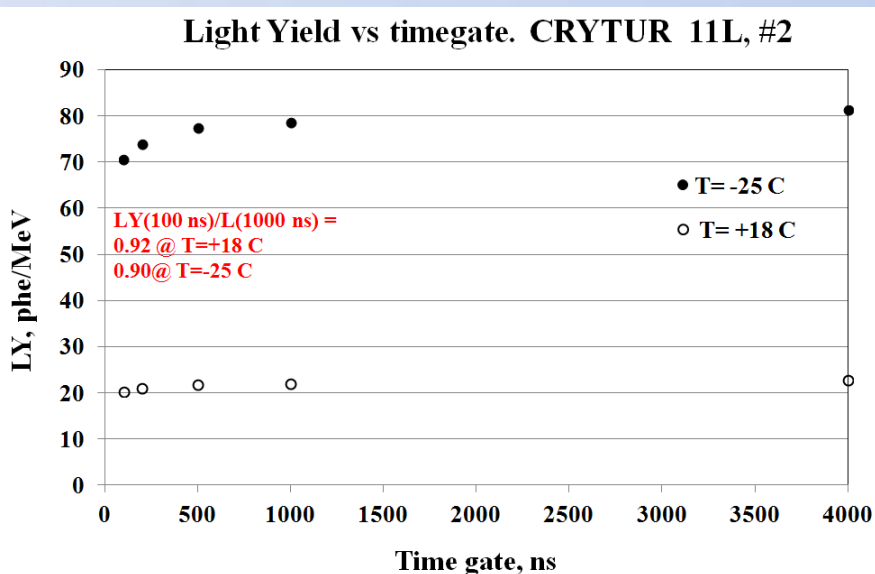
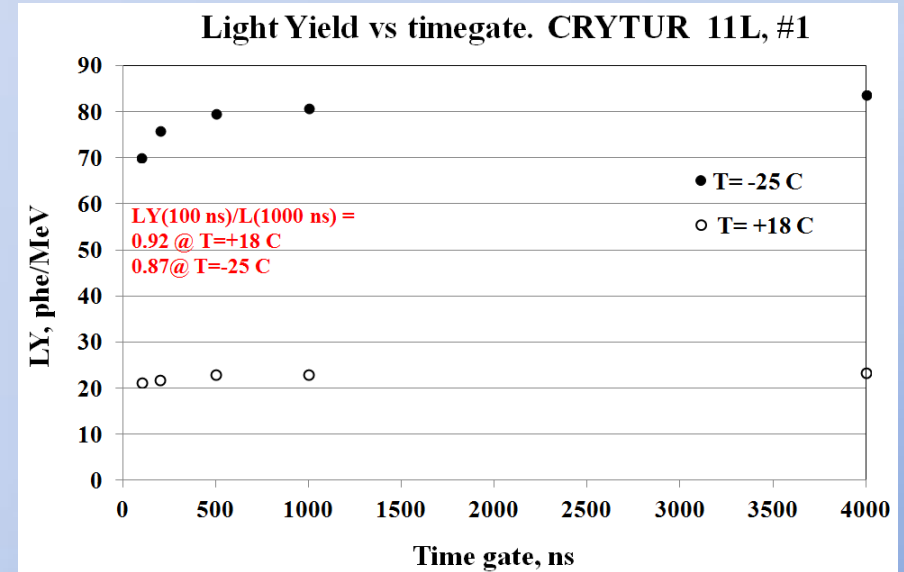
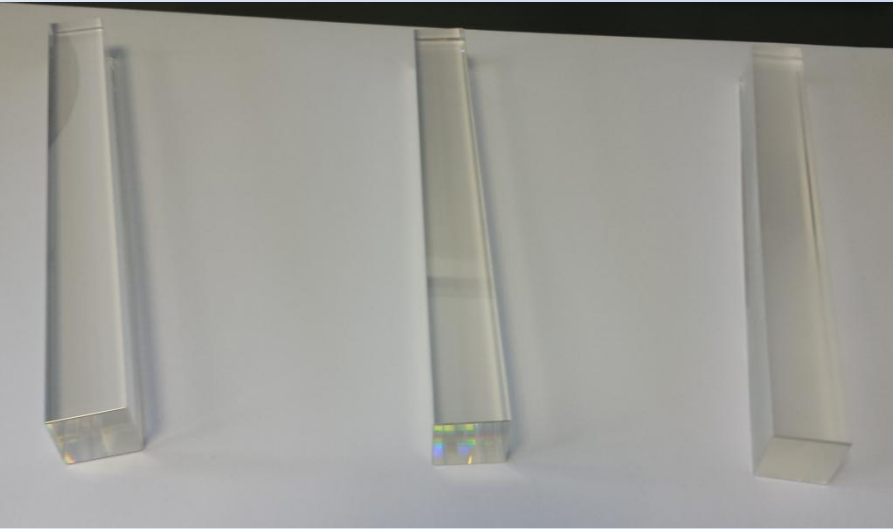


CRYTUR PWO S/N84 (May 2016)

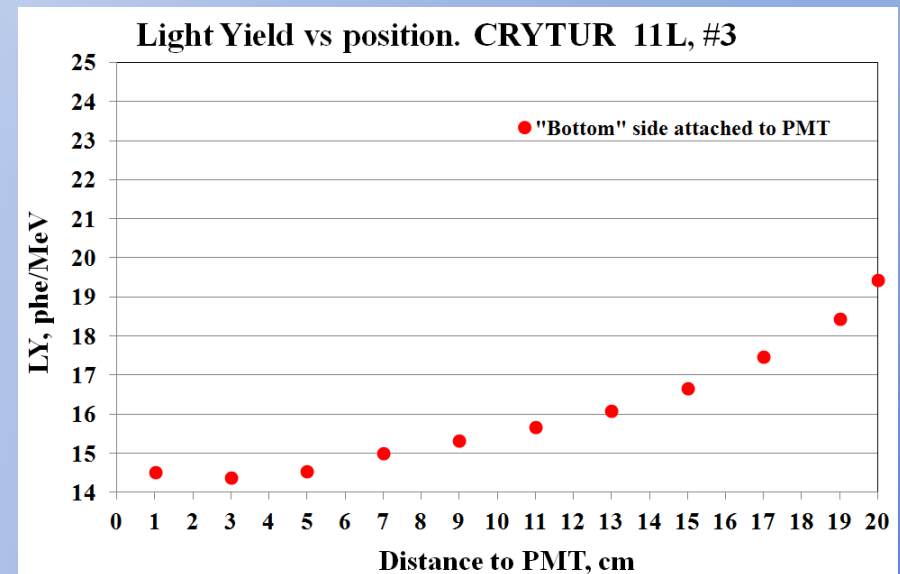
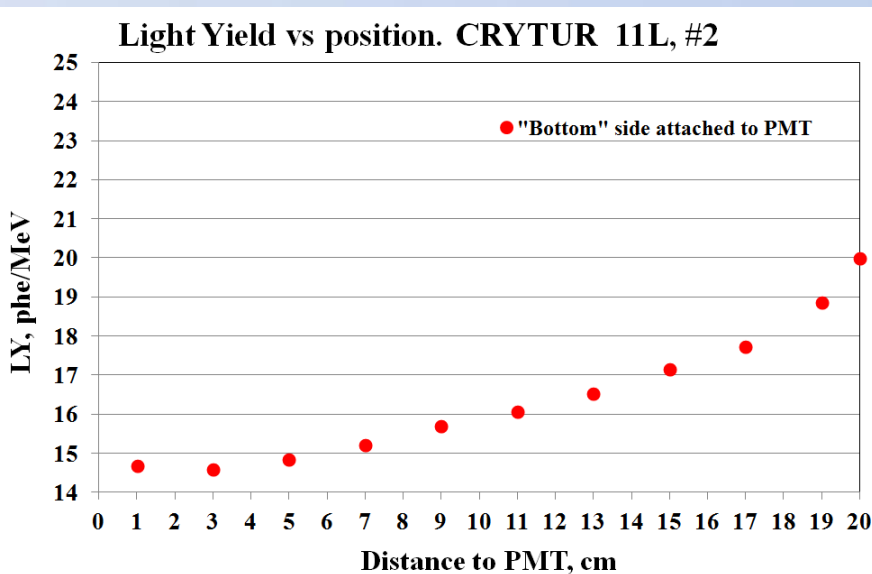
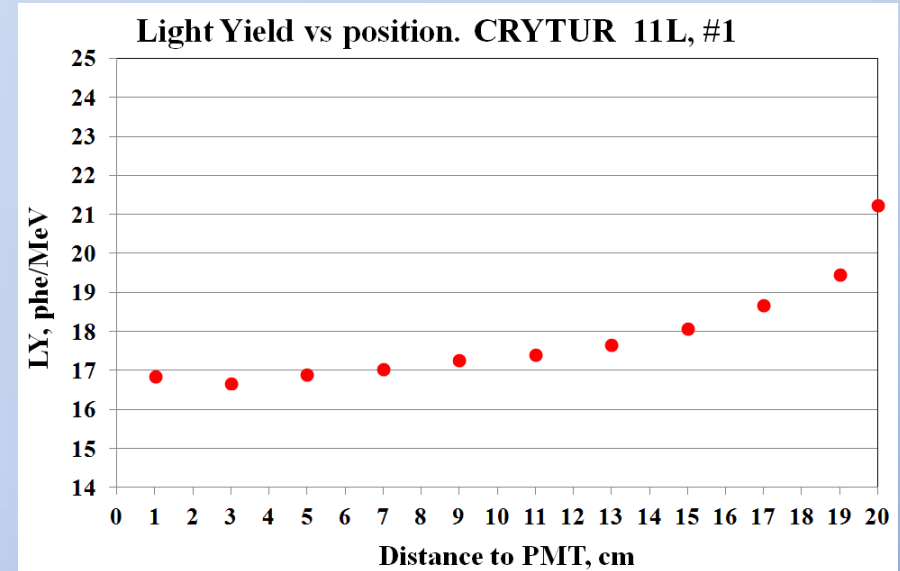
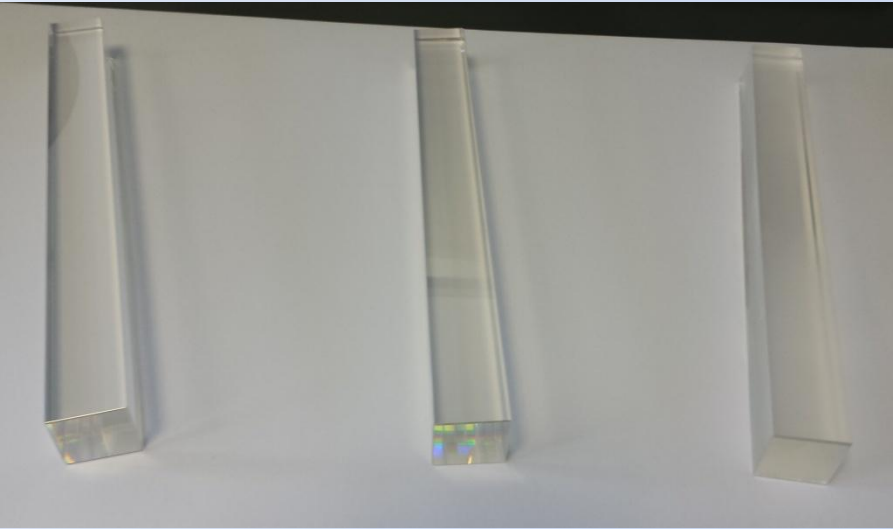
size: 20x20x200 mm³ Satisfied to PANDA EMC specification



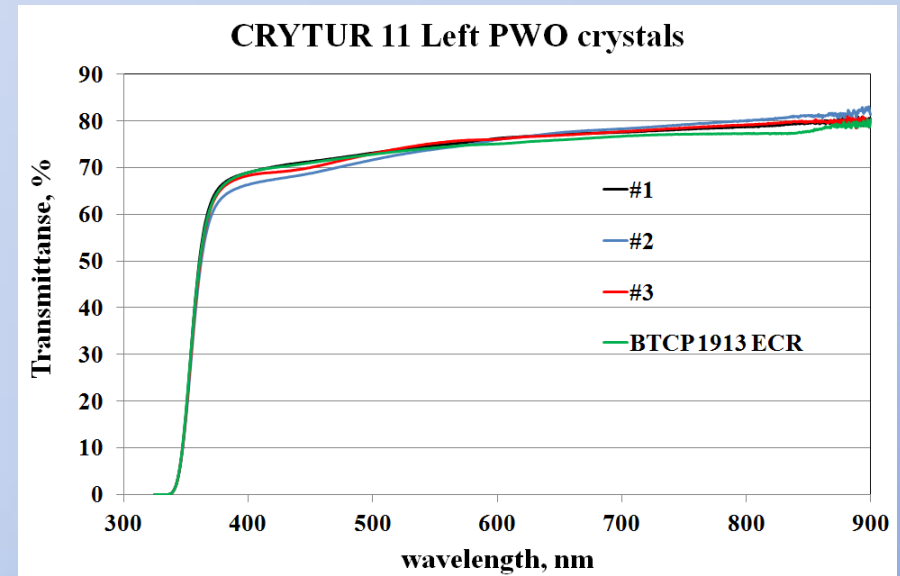
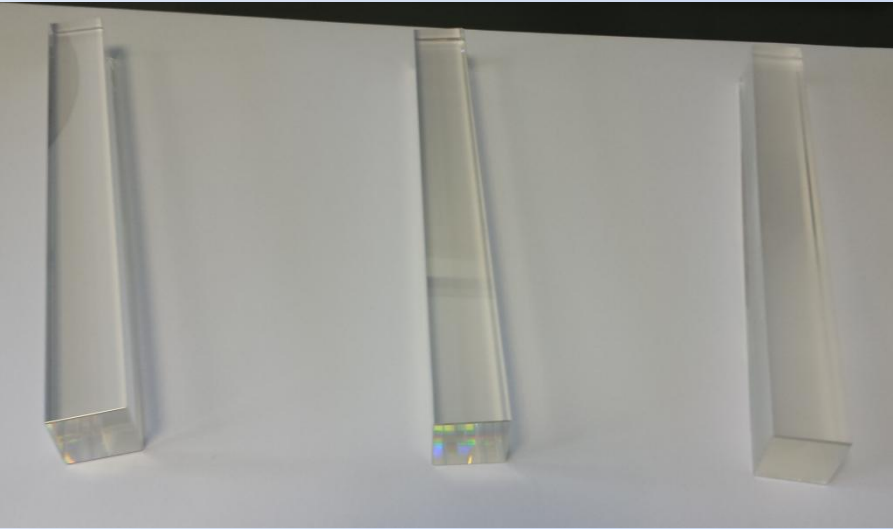
June 2016: first three crystals with PANDA EMC 11 Left geometry were delivered to Giessen



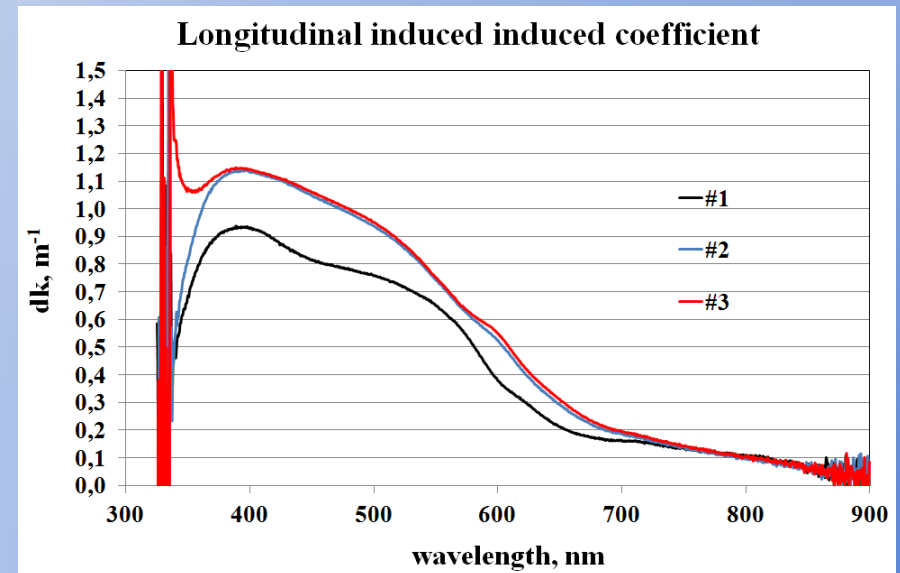
June 2016: first three crystals with PANDA EMC 11 Left geometry were delivered to Giessen



June 2016: first three crystals with PANDA EMC 11 Left geometry were delivered to Giessen



**Crystals are satisfied to
PANDA specification**



Summary and Outlook

- **CRYTUR technology based on Czochralski method was optimized for mass production of full size PWO crystals according to PANDA EMC specification**
- **Fine tuning of the technology optimization is still in progress**
- **First three crystals with PANDA EMC geometry (11 Left) were produced and tested**
- **Further steps for mass production of full size crystals are in progress:**
 - ovens installation
 - cutting and polishing machines preparation
 - delivery of raw material
 - tests setups for crystals quality control at CRYTUR, Giessen and CERN