

RaDIATE BNL BLIP Irradiation Run Planning VC Meeting 14

08.09.17

Present

CERN: Marco Calviani

KEK: Shunsuke Makimura, Taku Ishida

FNAL: Patrick Hurh, Sujit Bidhar, Bob Zwaska, Kavin Ammigan

ESS: Yongjoong Lee

BNL: Nick Simos, Dmitri Medvedev, Dohyun Kim

Oxford: Slava Kuksenko

Notes

- RaDIATE BLIP irradiation run 1 was completed on July 3rd, 2017
 - Target box received a total of $1.76e21$ POT
 - About 22 days in total with 146 μ A average current
 - Dose rate of target box (with high-Z capsule) was measured to be 40R at 18" in air on 08.08.17.
- Irradiation complete for Si, DS Ti and high-Z capsules. All achieved the minimum DPA requirement to proceed with PIE work.
- Be, C, Al and US Ti capsules will resume irradiation when BLIP restarts in January 2018 (first week), for about another 5 weeks.
- Update raster beam profile parameters during Run 1
 - Inner sweep radius of 5.5 cm and beam sigma of 5.1 mm (unchanged).
 - Outer sweep radius is now 12 cm instead of 15 cm. Hence, higher peak fluence, but reduced flat profile area.
 - Expect to obtain about 30% higher peak fluence (DPA)
 - **MARS calculations will have to be updated.**
- Target box is currently cooling down inside the BLIP hot cell, and not in the beam line. Dose rate was low enough to leave in hot cell.
- Isotope yield during irradiation run 1 was lower than expected. Actual capsule thicknesses were larger due to overall thickness stack up of the multiple specimen layers in each capsule, resulting in larger energy loss through the target box, and lower energy delivered to the isotope target
 - Dmitri will need updated blueprints for the Be, C, Al and US Ti capsules when planning for the next irradiation run.
- 1" of extra lead shielding will be added to the inner walls of the BLIP hot cell by the end of the year. Hot cell window thickness will remain unchanged.
- Dose rate estimates for the BLIP HiRadMat specimens to plan for experiment next year's HiRadMat experiment is needed.
 - Current dose rate limit in BA-7 building (HiRadMat facility) is 10 μ Sv/hr outside of the mobile table set-up cage.

- BLIP Ti specimens may be as high as 25 mrem/hr at 1 ft after 3-4 months cool-down. Extra shielding may be required at BA-7.
- PIE of Si, High-Z, DS Ti capsules
 - **Need to begin BNL arrangements for capsule shipment to PNNL.**
 - Mike Clancy is the contact person at BNL.
 - Dmitri will try to obtain individual dose rate measurements for the DS Ti, Si and High-Z capsules.
 - Currently planning to ship DS Ti and Si capsules in first shipment, and the high-Z capsule in a second shipment after further cool-down.
- Second BLIP run in 2018
 - Currently planning for another 5-week irradiation in 2018 to complete the desired 8-week irradiation.
 - Run needs to be scheduled as early as possible in order for Be, C, Ti specimens to be available for HiRadMat experiment later in 2018.
 - KEK is planning to add new capsule containing Ti alloys in the DS Ti capsule slot (1.75 mm thick of material)
 - CERN is considering adding a 0.5 mm thick layer of TaW alloy and/or low-Z coated materials in the upstream Si capsule slot. They would like a minimum of about 0.4-0.5 DPA in the TaW material.
 - **Decision on new capsules and materials needs to be made by the end of August.**
 - Nick has agreed to perform the FLUKA analysis and update the safety document prior to the irradiation run.
- PIE work arrangement with PNNL
 - Institutions need to set up work contracts with PNNL for their PIE work
 - CERN planning to do a purchase order with PNNL
 - Note that PNNL may not be able to accept shipment until a PO is in place.