Irradiation study of Ti-6Al-4V and Ti-6Al-4V-1B for FRIB beam dump: Preliminary results

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Outline

• Irradiation of samples with high energy heavy ions (NSCL-MSU)(Ca 40 @ 50 MeV/u) and low energy heavy ions at CIMAP-France(Ar 36 @ 36 MeV).
• Surface characterization using SEM-EBSD
• Comparing the same areas on the samples before and after irradiation.
Observations

- Deterioration of the quality of the EBSD scan after irradiation.

Sample 3 Ti64-1B
Irradiated at T-350C and a fluence of 1.00E+15 Ions/cm and dpa of 0.038dpa
Close analysis of few grains:

Before irradiation

After irradiation
Samples irradiated at high fluence and low Temperature

**Sample 4 Ti64**
Irradiated at T=20°C and a fluence of 1.00E+15 Ions/cm², estimated dpa of 0.038dpa

- No-EBSD possible
- EDS analysis to get the composition of this layer
Conclusion and future work

- No or little change in the grain orientations at the surface of the samples.
- Nano-indentation: Obtain the properties of the materials in depth
- FIB: characterize the microstructure in depth

![Graph showing dpa for Φ=1e15 ion/cm² Ar 36 @ 36 MeV]