

8th High Power Targetry Workshop (HPTW2023)



8th High Power Targetry Workshop
November 6-10, 2023



Contribution ID: 98

Type: **Poster**

Recent Progress in development of Toughened, Fine Grained, Recrystallized Tungsten

Tuesday, 7 November 2023 17:37 (1 minute)

In high-energy proton accelerator facilities, protons accelerated to several hundred MeV to several hundred GeV are irradiated to target materials, and the produced secondary particles are used in experiments to elucidate particle physics, and materials and life sciences. The recent major accelerator facilities have been limited in beam power not by their accelerators, but by target survivability. When secondary particles are transported to the experimental area, the spatial spread of the secondary particle source can be suppressed by increasing the density of the target material, thereby improving the transport efficiency. Therefore, tungsten, hereafter W, is expected to be used as a target material all over the world.

However, W is known to exhibit recrystallization embrittlement and irradiation embrittlement. High Energy Accelerator Research Organization has established an industry-academia, an international, and a domestic collaboration to develop Toughened, Fine Grained, Recrystallized, TFGR W, to surmount the shortcomings of the conventional W materials. TFGR W exhibits grain boundary reinforced nanostructures containing a high density of effective sinks for irradiation-induced point defects, a Ductile-to-Brittle Transition Temperature down to around RT and enhanced resistances against damages by thermal shock/fatigue in the recrystallized state.

Themes for the contribution

1 R&D to support concepts

Primary authors: MAKIMURA, Shunsuke (J-PARC/KEK); KURISHITA, Hiroaki (J-PARC, KEK); NIIKURA, Koichi (Metal Technology Co. Ltd.); ONOI, Masahiro (Metal Technology Co. Ltd.); INOTSUME, Masashi (SUNRIC Co., Ltd.); MATSUMOTO, Yasuhiro (SUNRIC Co., Ltd.); ISHIDA, Taku (J-PARC, KEK); ISHIDA, Masaki (J-PARC, KEK); SAKAMOTO, Tatsuaki (Ehime University); TAKETOSHI, MInato (Institute for Molecular Science, National Institutes of Natural Science); KAWANO, Shoya (Kyushu Institute of Technology); NAGAE, Masahiro (Research Institute for Applied Science)

Presenter: MAKIMURA, Shunsuke (J-PARC/KEK)

Session Classification: Poster session