

Development of Carbon-Nanotube Reinforced Tungsten Alloy

Tungsten is used as a proton-accelerator-target material. However, a significant amount of helium is produced through spallation process under high-energy proton irradiation, compared to nuclear fission and fusion materials. The produced helium forms bubbles at grain boundaries with increasing temperature, leading to fatal embrittlement of the material. Recently, it has been reported that adding carbon nanotubes to aluminum alloys suppresses helium bubble formation and enhances mechanical properties. Inspired by these methods, we have started developing tungsten alloys with carbon nanotubes via powder metallurgy. We conducted single helium ion irradiation on the first prototype materials. In this presentation, we will report a status of the manufacturing and the analysis of these materials.

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