

Dispersion Strengthened Copper Alloys Produced by Mechanical Alloying and Hot Isostatic Pressing for Divertor Application

Wednesday, 24 October 2018 08:30 (4 hours)

The realization of advanced fusion reactors rests with improvement of cooling capacity of divertors. Enhancing mechanical properties of Cu alloys is one of the critical issues for the improvement. This paper reports development of dispersion strengthened Cu alloys using ball-milling, encapsulation, and Hot Isostatic Pressing (HIP) facilities. Cu-Al, Zr and Y alloys have been produced so far. The new facilities installed in NIFS made it possible to control oxygen level of the products. In the case of Cu-Y, CuO was added in the middle of the milling for supplying oxygen. These processes resulted in formation of fine microstructures, oxide dispersion, and significant strengthening of Cu alloys.

Country or International Organization

Japan

Paper Number

FIP/P3-3

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Session Classification: P3 Posters

Track Classification: FIP - Fusion Engineering, Integration and Power Plant Design