

8th International Conference on Physical and Numerical Simulation of Materials Processing (ICPNS)

14–17 October 2016

Seattle, Washington | Hosted by Purdue University

SESSION 8: POSTER, GRAND PACIFIC BALLROOM

SUNDAY, OCTOBER 15, 2016

Hot deformation behavior of the fine-grain W-25Cu alloy

Li Ji wen; Xie Jing Pei; Wang Wen Yan; Wang Ai Qin; Ma Dou Qin, Henan University of Science and Technology

ABSTRACT

The high-temperature plastic deformation behavior of fine-grained W-25Cu alloy has been investigated on the Gleeble-1500 thermal–mechanical simulator at 985–1030°C with the strain rate of 0.01–5 s⁻¹ and the deformation of 60%. The results indicated that the rheological stress was decreased with the increase of the temperature, and increased with the increase of the strain rate. At the same temperature, peak stress was moved from low strain to high with the decrease of the stain rate. The constitutive equation, including rheological stress, strain rate, and temperature, was established by hyperbolic sine model with Zene–Hollomon parameter. The optimal deformation temperature range and the strain rates range are 985–1015°C and 0.01–0.1 s⁻¹, respectively. The hot deformation mechanism of W-25Cu composites is dynamic recovery and dynamic recrystallization during thermal compression.

KEYWORDS: W-25Cu composites, strain rate, constitutive equation, deformation mechanism