

A Preliminary Study for the Development of 9CR Fe-base ODS Alloys: The Effects of Minor Elements and Cooling Rate

Jinsung Jang¹, Young Moon Jang², Yin Zhong Shen¹

¹Nuclear Material Technology Development Division, Korea Atomic Energy Research Institute, Korea;
²-, HHI, Korea

Abstract

Three 9Cr Fe-base ODS alloys were prepared by MA (mechanical alloying) and HIP (hot isostatic processing) processes. The addition of Ti was confirmed to have a significant effect on the tensile properties at high temperature as well as at the room temperature, while the V addition did not show a clear effect on the microstructure or on the mechanical properties at both temperatures. Fine and evenly distributed Y and Ti containing complex oxide was detected in the Ti added ODS alloy and those were attributed to the good high temperature strengths. Different cooling rates from the normalizing temperature revealed to result in not much change in the grain boundary characters but significant differences in the mechanical properties. This is mainly attributed to the difference of the matrix phase rather than to the grain size distribution or the grain boundary characters.