Contribution ID: **275** Type: **not specified**

Reactivity and thermal stability of ternary Be-Zr-V beryllides

Monday, 17 September 2018 11:00 (2 hours)

As a water-cooled solid breeder blanket of a fusion reactor, safety concern has become one of the most critical issues. In specific, Be pebbles as a multiplier have been well-known to generate hydrogen and exothermally react while a loss of coolant accident (LOCA) occurred. In contrary to these Be pebbles, Beryllium intermetallic compounds (beryllides) are one of promising materials because of its much more stable chemical reactivity at high temperatures. Currently, many works on the development of advanced neutron multipliers by Japan and the EU is part of the DEMO R&D activities at the International Fusion Energy Research Center (IFERC) project, which forms a part of the Broader Approach (BA) program. Fabrication methods of beryllides pebbles have been successfully developed by combining a plasma sintering synthesis method and a rotating electrode granulation method.

By using these methods, preliminary synthesis of the ternary beryllide pebbles with mixtures of Be13Zr and Be12V with ratios of 1:0.1, 1:0.4, 1:0.6, 1:0.8, and 1:1, has been conducted. It was clear that small size of Be13Zr phase as precipitate and Be12V phase formed without Be phase formation since those composition does not contain the peritectic reaction.

Additionally, the ternary beryllide pebbles found out to have a lower reactivity to water vapor as well as a higher thermal stability. In the present study, not only synthesis process but also characterizations at high temperatures will be introduced.

Co-author: KIM, Jae-Hwan (Department of Blanket Systems Research National Institutes for Quantum and Radiological Science and Technology)

Presenter: KIM, Jae-Hwan (Department of Blanket Systems Research National Institutes for Quantum and Radiological Science and Technology)

Session Classification: P1