Contribution ID: **678** Type: **not specified**

P2.106 Heat load testing of 3D printed PFC mockups to evaluate thermo-hydraulic enhancement

Tuesday, 18 September 2018 11:00 (2 hours)

ITER and DEMO plasma facing components (PFCs) should remove the extreme heat flux up to 10 MW/m^2 and the various type of PFCs have been developed for enhancing the heat transfer performance such as hypervapotron and twisted tape insertion. For the limitation of complexity to mechanical machining, three-dimensional (3D) metal printing technology by direct energy deposition is used to fabricate the multi-layer cooling devices for the development of PFCs research in Korea, also for the optimization of the thermo-hydraulic performance with the water cooling in a Korean heat load test facility by using an electron beam (KoHLT-EB). Two-type's cooling structure were fabricated with aluminum-bronze metal powder by using 3D printing method, one type has the flat cooling channel with an elliptic shape, and the other type has the swirl tape with a hollow shape. Preliminary thermo-hydraulic analysis was performed to confirm the effects of cooling geometry inside with a conventional CFD code, ANSYS-CFX. KoHLT-EB facility was used to evaluate the enhancement of the cooling performance, and the heat load was applied from 1 to 10 MW/m^2 to evaluate the thermos-hydraulic performance for each enhanced channel device. The present research results will contribute to the development of a Korean fusion reactor and DEMO program.

Presenter: KIM, Suk-Kwon (Nuclear Fusion Technology Development Division Korea Atomic Energy Research Institute)

Session Classification: P2