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# P3.199 Development of W-monoblock divertor components with included thermal barrier interfaces

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In the case of DEMO fusion reactor, the divertor should be able to extract a steady heat flux of about 10 MW/m2. A promising concept is the W-monoblock. which should be connected to a CuCrZr or an advanced Cu ODS alloy pipe passing through the W component. Taking into account the optimum operating temperature windows for W and existing Cu-based alloys and the thermal expansion coefficients mismatch of these two materials, a “thermal barrier” interface material is inserted in between in order to mitigate the thermal stresses and to optimize the heat flow through divertor components. In this work we investigate the feasibility to realize such divertor components using materials produced by FAST (field assisted sintering technology). This powder metallurgy technique was used firstly to produce W or W-based composites and the thermal barriers in an almost final shape and then to join the materials in realistic divertor mock-ups. The thermal barrier materials are various Cu-based composites [1,2] which are included both as single material or as functionally graded components. The interface quality between different materials is investigated by scanning electron microscopy and the heat flow through components is evaluated using simulations.
[1] M. Galatanu, M. Enculescu, G. Ruiu, B. Popescu, A. Galatanu, Fus. Eng. Des. 124 (2017) 1131.
[2] M. Galatanu, M. Enculescu, A. Galatanu, Fus. Eng. Des. 127 (2018) 179.

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