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composite**

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FABRICATION AND PROPERTIES OF THE SITE-SiC_f/SiC COMPOSITE

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Continuous SiC-fiber-reinforced SiC composite (SiC_f/SiC) is an attractive candidate structural material for advanced concepts of future fusion power plants, mainly due to the favourable intrinsic properties of the SiC ceramics, i.e. high temperature- and chemical stability, low neutron activation and afterheat levels as well as due to the fact that it is the only non-magnetic material proposed. Fabrication of such composites is a very challenging task due to limitations and requirements set for fusion-relevant structural materials.

The SITE-P, a recently introduced route for fabrication of 3D-SiC_f/SiC composites, and the properties of the prepared material will be presented. By using the process, which involves filling the 3D woven SiC-fibre preform with a mixture of submicron and nanosized SiC powder as a passive filler and further infiltration by pre-ceramic polymer and heat treatment, a composite with low and fine porosity was achieved. Homogeneous microstructure, high matrix crystallinity and favourable grain size contributed to relatively high thermal conductivity (~ 60 W/mK at room temperature and 30 W/mK at 1000 °C) in comparison to other state-of-art materials. The main remaining issue for the material is its poor strength, which results from the inactive (too thin and in some places non-existent) PyC interphase layer.

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