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Influence of the interface strength on the mechanical properties of discontinuous tungsten fiber-reinforced tungsten composites produced by field assisted sintering technology

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Abstract. In future fusion reactors, tungsten is a main candidate material for plasma-facing components. However, the intrinsic brittleness of tungsten is an issue under the extreme fusion environment. To overcome this drawback, tungsten fiber-reinforced tungsten (W_f/W) composites are being developed relying on an extrinsic toughening principle. In this study W_f/W composites are produced by a Field-Assisted Sintering Technology (FAST) process with different fiber-matrix interfaces. The fracture behavior was studied by 3-point bending tests on notched samples. 4-point bending tests and tensile tests are performed to measure the flexural strength and tensile strength, respectively. W_f/W with a weak interface shows a typical pseudo-ductile