Contribution submission to the conference Regensburg 2016

Chemical vapor deposition and infiltration for the production of tungsten fiber reinforced tungsten composite material — •Martin Aumann[1], Jan Willem Coenen[1], Hanns Gietl[2], Till Hoeschen[2], Johann Riesch[2], Klaus Schmid[2], Rudolf Neu[2], and Christian Linsmeier[1] — [1]Forschungszentrum Juelich GmbH, Institut für Energie- und Klimaforschung, 52425 Juelich — [2]Max-Planck-Institut für Plasmaphysik, 85748 Garching

Due to its high melting point, high corrosion resistance and its preferable properties in terms of hydrogen retention, tungsten is a promising candidate in future nuclear fusion devices. However, the mechanical behavior of tungsten is crucial, as it is inherently brittle at room temperature. As possibility to overcome this brittleness, a composite material can be formed, which shows pseudo-ductility and therefore avoids catastrophic failure of the material. A possibility to produce such a Wf/W-composite is chemical vapor deposition and chemical vapor infiltration, where tungsten is deposited on small tungsten wires through the reaction of WF6 and H2. With ongoing infiltration time, pores are formed between the fibers, which decrease in size through the chemical reaction. For better process understanding, a pore model was established, which solves the mass balance inside the pore and the resulting pore diameter simultaneously. It shows a significant difference in diameter for longer infiltration times. This behavior shall be proved in experiments with an experimental pore, which is similar to the simulated one. Furthermore also kinetic investigations on the chemical surface reaction are carried out to increase the process understanding.

Part:	**MM**
Type:	**Vortrag;Talk**
Topic:	**Transport (Diffusion, Leitfähigkeit, Wärme)/ Transport (Diffusion, conductivity, heat)**
Email:	**m.aumann@fz-juelich.de**