



INTERDISCIPLINARY CENTRE FOR
ADVANCED MATERIALS SIMULATION

ICAMS Seminar

Dr. Eiken

Access e.V., Aachen.
Germany

Monday, November 28, 4:30 p.m. ICAMS Seminar room UHW 11/1102

Phase-field-studies of peritectic solidification in Ti-Al-alloys

During solidification, TiAl-based alloys with aluminum contents around 45 at % commonly undergo a peritectic reaction. The primary $\beta(\text{Ti})$ phase reacts with the residual liquid to form the properitectic $\alpha(\text{Ti})$ phase. The evolution of the triple junction, where all three phases are in direct contact, presents a complex kinetic process, whose controlling mechanisms are still unclear. In the frame of an ongoing research project at Access e.V., phase-field simulations have been performed to enlighten the interaction of solute diffusion and capillarity forces. An interesting detail in this context has been the role of the wetting behavior on the reaction kinetics. A special challenge of the phase-field study has been the demand to precisely predict interface kinetics and junction angles. The required high accuracy has become feasible by a novel numerical solution scheme for phase-field equations, which minimizes the discretization error. Both, the improved solution scheme as well as the simulation results for TiAl will be presented.

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