SolKin - Computer Program Simulating the Evolution of Concentration Distributions and Microstructural Features During Solidification of Multicomponent Aluminum Alloys

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ABSTRACT

In the presentation, the principle of one-dimensional microsegregation modeling is introduced. It is shown how the coupling of thermodynamics and kinetics allows for predicting microstructural features by simulating the solid/liquid phase transformation in detail.

The computre program SolKin predicts dendrite arm spacings, type and amount of solidifying phases and element distributions. Functionality, input parameters and possible results of the software are demonstrated. By incorporating CALPHAD type phase equilibrium calculations using the software ChemApp, multicomponent systems can be effectively treated. A variety of physical effects that are known to influence microstructural evolution are included. Excellent agreement for well established alloy system is achieved. A good quality of thermodynamic data is the prerequisite for realistic results.