

## **Modelling of solid-state transformation kinetics in alloys using the ChemApp thermodynamic library: few case studies on commercial alloys**

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Thermodynamic and kinetic knowledge is indispensable to understand the microstructural development of alloys. The new alloy development requires the tailoring of the homogenization and final aging treatment conditions for better combination of mechanical properties. In a typical heat treatment, the homogenization or redistribution of solutes and dissolution of secondary phases occurs simultaneously. In some cases, precipitation of new phases can occur concurrently as well. In order to physically describe the microstructure evolution under such complex heat treatments, the linking of homogenization, dissolution and precipitation process is necessary.

In order to keep pace with alloy developments, light alloy and steel thermodynamic database has been developed by the FactSage group ([www.factsage.com](http://www.factsage.com)) over the last 15 years. Recently, solidification, diffusion and precipitation simulation models for alloys have been also developed to predict the evolution of as cast and homogenized microstructure. In the present talk, the application of these diffusion-based models in designing the heat treatments for certain commercial Ni, Mg and Al alloys will be shown.