

Problems and Pitfalls in Evaluating Phase Equilibria and Thermodynamic Data

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Knowledge of phase equilibria, often in the form of phase diagrams is crucial in materials design and processing. As a starting point, the Materials Researcher will first consult the scientific literature to find appropriate phase diagrams relevant to their application. They will immediately find any number of phase diagrams, some quite different from others, all claiming to represent the phase equilibria in a particular system.

As early as 1936, Materials Scientists began to evaluate all available experimental data relating to specific systems and publishing their findings in compendia. These compendia have become the mainstay of materials design and also for 'calphad' modelling, where the main intellectual effort is in data evaluation before model parameterisation takes place. Of course, it is important that the information given in such compendia are reliable.

This lecture will outline the evaluation process and show some of the problems that can be encountered in choosing reliable information.