

ABSTRACT

Experimental Determination of Interdiffusion Coefficients and Phase Diagrams with Diffusion Couples in Multicomponent Systems

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B2 (Ni,Pt)Al system is the most popular system used for bond coats deposited on Ni-based superalloys. A detailed investigation of interdiffusion carried out in this system with ternary diffusion couples will be presented. Emphasis will be given to highlight the significance of purely experimental interdiffusion coefficients and associated diffusional interactions. Role of platinum in avoiding Ni based spinel oxides in TGO layer is explained based on the observed diffusional interactions. Additionally, a newly developed concept of iso-Gibbs free energy diffusion couples will be introduced and the observed diffusion paths and reduced diffusion depths in such couples will be discussed in Fe-Ni-Cu and Fe-Ni-Co systems.

One of the potential areas for application of diffusion couples is the experimental determination of multicomponent phase diagrams. However, it has not been utilized as much as it should be.

Recent work on determination of quaternary isotherm in Fe-Ni-Co-Cu at 950 °C will be presented.