ATOMIC LEVEL CHARACTERIZATION OF PRECIPITATION IN ALLOY 718

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Alloy 718 derives it good mechanical properties from a fine dispersion of ordered precipitates in a face centered cubic matrix. However, the precise nature of these precipitates has been resolved only recently through atomic level characterization of the compositions of these precipitates in a three-dimensional atom probe. Atom probe tomography has revealed that these fine (< ~20 nm diameter) precipitates generally consists of two distinct types of regions that are enriched either in niobium or in aluminum and titanium that are characteristic of the γ″ and γ′ phases, respectively. Reasonable agreement may be achieved between atom probe measurements and thermodynamic predictions of the compositions of these phases when additional microstructural information is taken into account and absent phases are suppressed in thermodynamic calculations.

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