

Tutorial problems and questions

1. Is the antiphase boundary in an ordered alloy a homophase boundary or heterophase boundary?

Answer

The antiphase boundary in an ordered alloy is a homophase boundary because it separates two different domains of the same ordered phase.

2. In an ordered alloy, the interface between two differently ordered domains (known as antiphase boundaries) exist. Are they coherent or incoherent interfaces? Why?

Answer

In an ordered alloy, the interface between two differently ordered domains (known as antiphase boundaries) exist. These are typically coherent interfaces. This is because across the antiphase boundary the lattice planes are continuous and only the site occupancy is different. For example, across an antiphase boundary in a B2 ordered structure, the body centers are occupied by A type of atoms instead of B type of atoms and cube corners are occupied by B type of atoms instead of A type of atoms.

3. Coincident site lattice: is it coherent, semi-coherent or incoherent? Why?

Answer

Coincident site lattices are semi-coherent; this is because any Σ boundary has certain number of continuous lattice planes across the boundary; for example, in a Σ boundary, once in every five lattice boundaries are continuous (In general, a $\Sigma 5$ boundary means once in Σn lattice planes are continuous).