Advanced Physical Metallurgy "Amorphous Materials"

Class # Name

1. Explain clearly for four types of disorder in imperfect crystals by considering following figures.



2. What are the 4 major contributors for substitutional solid-solution formation?

3. () are () solids that exhibit rotational symmetries incompatible with conventional periodic lattice order, for example, (symmetery in three dimensions and () symmetry in the plane. The first example was obtained as a metastable icosahedral configuration in rapidly solidified). Soon after this discovery, thermodynamically () quasicrystals were found in several other alloys. At present both metastable and stable guasicrystalline phase can be formed in a variety of metallic alloys. And certain stable phases can be) several millimeters or even centimeters in size. It would grown into a (appear obvious, therefore, that quasicrystals can represent a free-energy minimum state at a given temperature. Such highly perfect quaicrystalline materials exhibit a striking diffraction pattern; namely, (i) a large number of () peaks, (ii) peak) comparable to that from nearly perfect crystals such as silicon, and (iii) all peaks are located at their ideal positions, consistent with the quasicrystalline symmetry within the limits of instrumental resolution.

Al-Mn alloy/ aperiodic/ single grain/ sharpness/ Quasicrystals/ icosahedral/ tenfold/ diffraction/ stable