

Session #20: Homework Problems

Problem #1

Identify 3 types of crystal defects in solids (one point, one linear and one planar) and suggest for each of these one material property that is adversely affected by its presence and one that is improved. Also state what to look for in a crystal that possesses each of these defects.

Problem #2

Identify the directions of slip for indium (In) on the (111) plane.

Problem #3

A cubic metal ($r = 0.77 \text{ \AA}$) exhibits plastic deformation by slip along $\langle 111 \rangle$ directions. Determine its planar packing density (atoms/m²) for its densest family of planes.

Problem #4

- (a) List four different defects in crystalline solids.
- (b) What evidence is available supporting the actual existence of the listed defects?

Problem #5

Attempt to account for the fact that polycrystalline aluminum (Al) has a higher tensile strength than single crystalline Al. Support your answer with an appropriate sketch.

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