

Solution:

This plane has intercepts $\frac{1}{2}$, -1 and $\frac{1}{2}$, so that the Miller indices are $[2\bar{1}2]$.

1.5 Write the Miller indices for plane vwz.

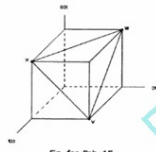


Fig. for Prob. 1.5

Solution:

On the assumption that parallel planes can be described by the same set of Miller indices, this plane should have the same indices as plane (C) of Fig. 1.16, which are (111) .

1.6 Linear density in a given crystallographic direction represents the fraction of a line length that is occupied by atoms. Similarly, planar density is the fraction of a crystallographic plane occupied by atoms. The fraction of the volume occupied in a unit cell, on the other hand, is called the atomic packing factor. The latter should not be confused with bulk density, which represents weight per unit volume.

(a) Calculate the linear density in the $[100]$, $[110]$, and $[111]$ directions in body-centered cubic (bcc) and face-centered cubic (fcc) structures.

(b) Calculate planar densities in (100) , (110) , and (111) planes in bcc and fcc structures.

(c) Show that atomic packing factors for bcc, fcc, and hexagonal close-packed (hcp) structures are 0.68, 0.74, and 0.74, respectively.

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