

NANO 703/703L - Quiz 3

1) The Miller indices of allowed reflections for the three types of cubic lattices follow certain rules.

- Special conditions were found on some reflections for the **diamond** structure.
- For the [001] variant of the ordered CuAu-I structure (**CA [001]**), allowed reflections have h and k both even or both odd. (l can be any integer.) It has no kinematically forbidden reflections.
- For the [001] variant of the ordered chalcopyrite structure (**CH [001]**), allowed reflections have $h+k+2l = \text{even}$, where h and k can be any integers, except for those with $h+l$ and $k+l$ both odd, which are kinematically forbidden.

For the various structures in each column:

Put a “√” in the cell if it is an *allowed* reflection.

Put a “*” in the cell if it is a *kinematically forbidden* reflection.

Leave the cell blank (or put an “X”) if the reflection is *absent*.

hkl	a) sc	b) fcc	c) bcc	d) diamond	e) CA [001]	f) CH [001]
100						
001						
110						
$\bar{1}\bar{2}0$						
111						
020						
221						
004						
222						
011						
323						
201						
$01\frac{1}{2}$						
$\frac{1}{2} \frac{3}{2} \frac{3}{2}$						