In Class 9: Structure and Properties of Solids

1. For the following solid substances, draw a representation of the atomic/molecular level interactions in a solid form of it! Say what type of solid it is and what forces are holding it together!

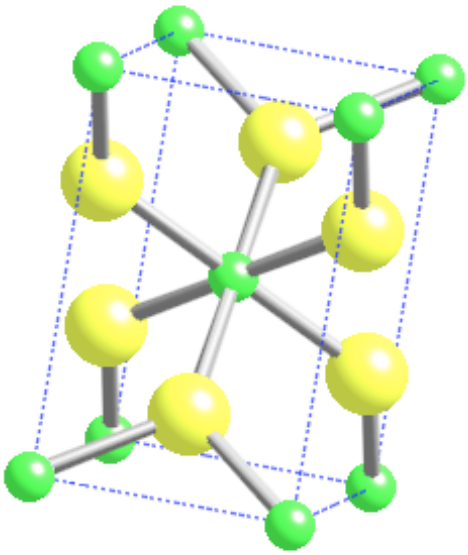
$CaCl_2$ NH_3

$Cu(NO_3)_2$ brass (formula = Cu_3Zn_2

CO_2 Si Ne

2. Below is a representation of the smallest repeating unit of an oxide of silicon that is NOT the normal one observed for quartz.

a. Based on this structure, if the oxides are represented by the large spheres and the silicon by the small spheres, what is the formula for this compound? Show your work by clearly by indicating why you counted particular atoms the way you did? (5 pt)



b. *Approximately* what type of lattice do the Si make by themselves? (3 pt)

c. Briefly, after examining the unit cell closely, why is that lattice not *exactly* the one you indicated? (2 pt)

d. What is the coordination number of the oxides? (2 pt)

e. What is the coordination number of the Si on the corners? (2 pt)

f. This structure has a similar structural arrangement of atoms in 3D space as one of the others you encountered in Lab 6. Which one? (2 pt)

g. What category of solid does this compound form (i.e. what kind of forces hold it together? (2 pt)

3. Explain why K metal is a good conductor of electricity and is malleable (don't try at home!), but KCl is a poor conductor in the solid state and brittle. Use diagrams of the bonding models to help your explanations.