

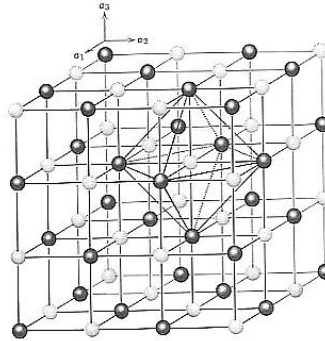
Chapter 12 – Solids and Modern Materials

• 12.1 Classification of Solids – 12.2 Crystalline & Amorphous Solids

- crystalline vs. amorphous solids

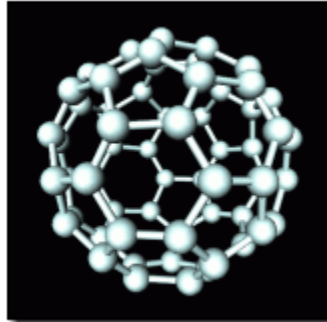
-- crystalline solid: cubic array of tightly packed atoms or molecules

--- ionic solids – NaCl, comprised of an anion and a cation



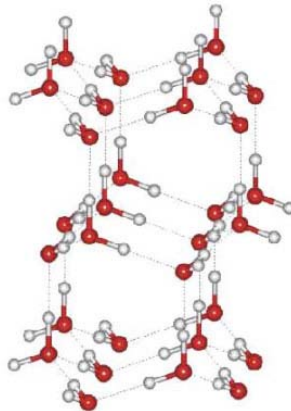
<http://metafysica.nl/nacl.jpg>

--- atomic solids – buckminsterfullerene, C_{60} , composed of a single atom type (this encompasses both covalent-network & metallic solids)



<http://www.ill.fr/dif/3D-crystals/>

--- molecular solids – ice, composed of molecules

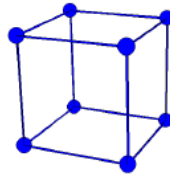


http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch14/graphics/14_12fig.gif

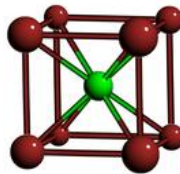
-- amorphous solid: disordered structure e.g. volcanic glass

- Unit Cells & Crystal Lattices

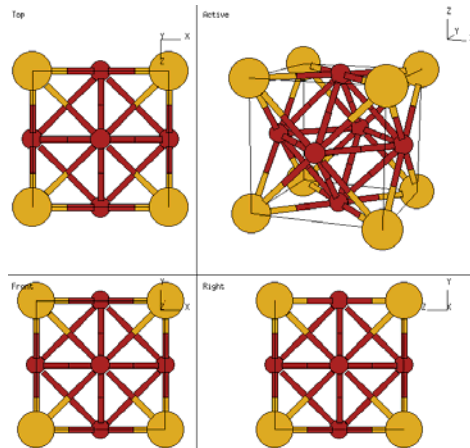
- lattice: refers to the 3D array of particles in a crystalline solid
 - lattice points: are the points of array that are occupied by a particle
 - types of lattice points:
 - Corner which are shared among 8 unit cells so only $1/8^{\text{th}}$ is in any cell
 - Edge which is shared with 4 unit cells making its contribution $1/4^{\text{th}}$
 - Face which is between 2 unit cells so $1/2$
 - Body piece is completely inside a unit cell so it fully contributes 1
- unit cell: basic repeating unit of the particle arrangement in a crystalline solid
- types of arrangements:
 - simple cubic: has lattice points only at the eight corners of a unit cell



- body centered cubic: has eight corner lattice points as well as a center particle



- face-centered cubic: has 8 corner lattice points and a particle at the center of each of the six faces



• 12.3 – 12.9 – Skip it!