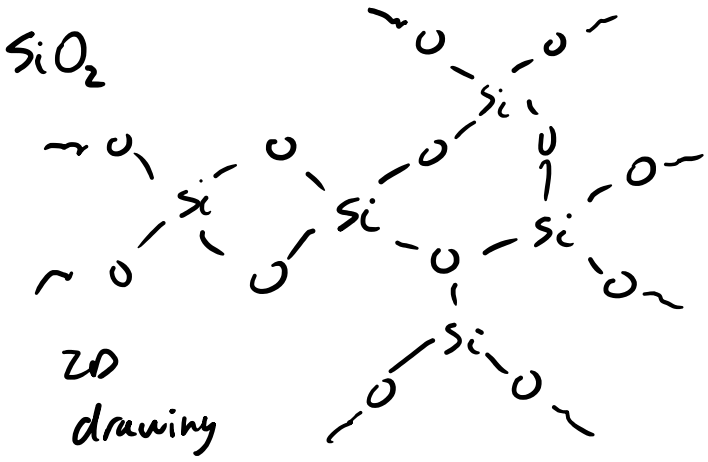
APS110H1f2024 November 13, 2024

November 12, 2024 8:09 AM

Cu^{2+} O^{2-}

Insulators – ceramics – Al_2O_3 SiO_2 CuO TiO_2

– $AlCl_3$



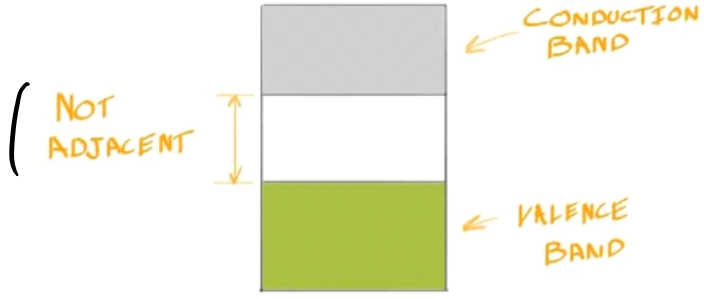


Figure 14. The band structure for an insulator, showing the valence and conduction bands with a large gap between them

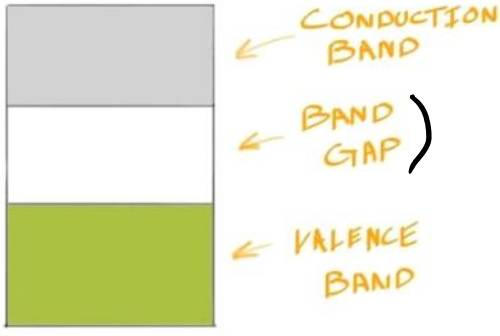
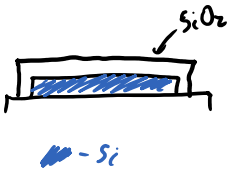


Figure 15. The band structure for an insulator, with the band gap identified as well as the valence and conduction bands.

Semiconductors

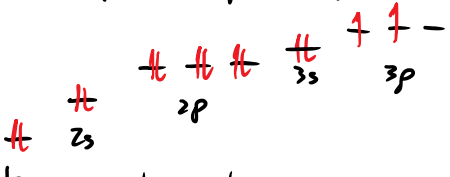
November 11, 2024 9:10 AM

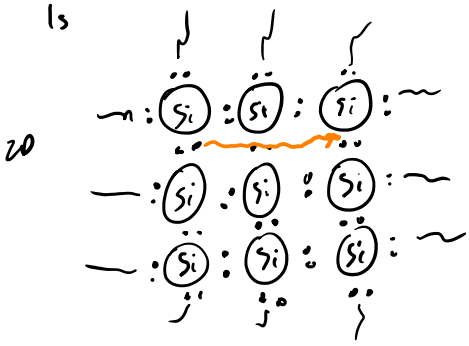


silicon

Si $[Ne]\,3s^2 3p^2$

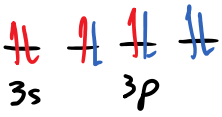
$= 1s^2 2s^2 2p^6 3s^2 3p^2$





sp^3 hybrids

sp^3 hybridization "donated"



only when bonded.

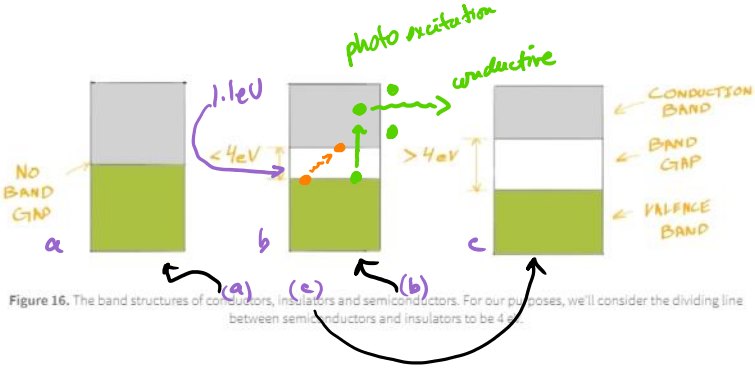


Figure 16. The band structures of conductors, insulators and semiconductors. For our purposes, we'll consider the dividing line between semiconductors and insulators to be 4 eV.

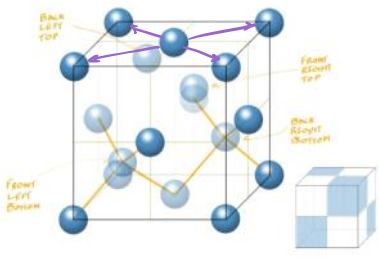


Figure 19. The structure of diamond cubic. This structure can be thought of as an FCC lattice of atoms with the same atoms occupying half of the available tetrahedral interstitial sites, in alternating positions. The alternating positions are illustrated with the shaded "sub-cube" faces in the second cube.

Periodic Table - Electron Configuration

November 8, 2024 2:00 PM