

METAL ALLOYS → mixtures of different metals,
or of metals and one or more nonmetals
→ changes the properties

A) SUBSTITUTIONAL ALLOY

→ original metal atoms are replaced
are replaced with 1 or more different
metals of similar size

Brass ~ $\frac{1}{3}$ of Cu replaced w/ Zn
Sterling Silver · 92.5% Ag, 7.5% Cu
Pewter 85% Sn, 2% Cu, 6% Bi, 2% Sb

B) INTERSTITIAL ALLOY

- holes (interstices) in the metal lattice
are occupied by small atoms

Steel ~~is~~ C in holes in Fe lattice
the more C, the greater the effect

mild steel < 0.2% C ⇒ nails, chain
med steel 0.2 → 0.6% C ⇒ rails, beams
high C steel 0.6 → 1.5% C ⇒ blades, springs

(4) Covalent solid (network solid)

- atoms at lattice ⇒ held together by
covalent bonds

- hard, high mp, brittle

- insulators ⇒ large band gap

C, Si

nonmetals + O ⇒ molecules

BUT: SiO₂

covalent solid (silica)

quartz, gemstones

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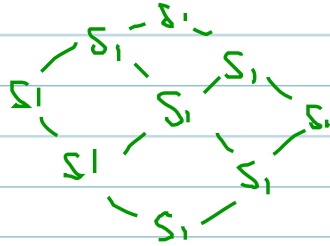
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SEMICONDUCTORS

Si, Ge
insulators

doping \rightarrow replace semiconductor elements w/ different elements



n-type \Rightarrow excess e^-

Swap 4A w/ 5A atom

p-type \Rightarrow e^- deficient

Swap 4A w/ 3A atom