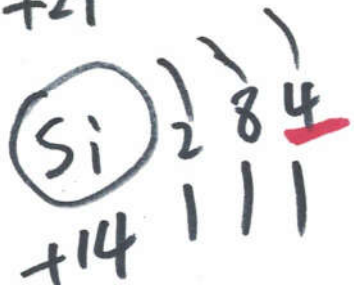


Semiconductor Basics

Si Ge Ga As

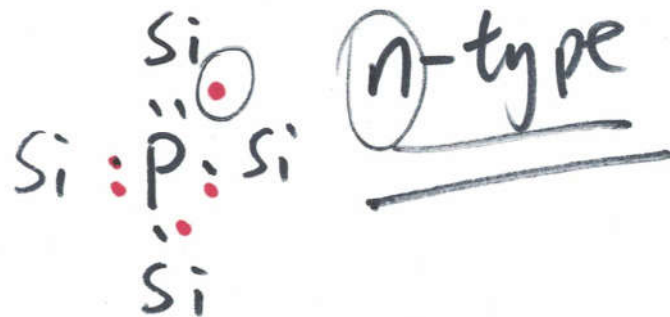
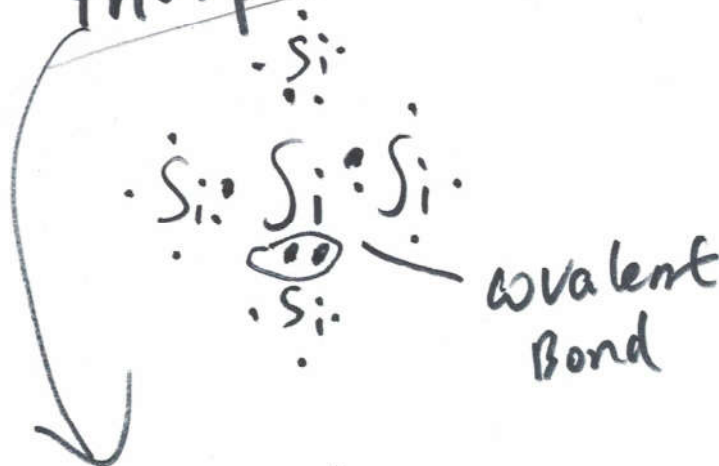
Copper — conductor

Glass — insulator

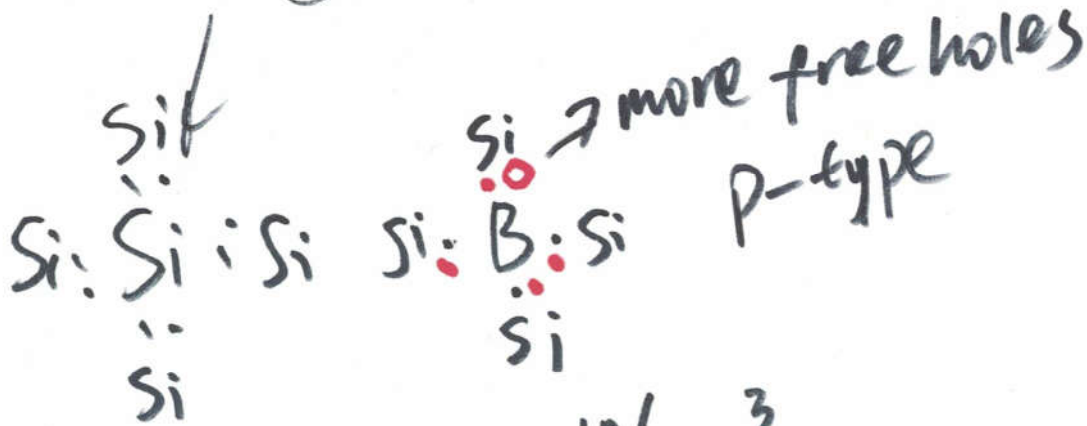
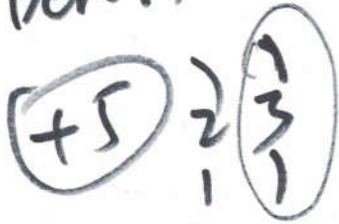


Dopants

Phosphorus Boron



Boron



① $n = p = n_i = 1.5 \times 10^{10} / \text{cm}^3$

of free electrons and holes in a intrinsic semiconductor (Si)

per unit volume cm^3

↑
not doped

$np = n_i^2$

intrinsic
extrinsic

②

② Concentration of selection donor atoms: N_D

$N_D \approx n_n$ n-type
majority

③ when equilibrium is achieved

$$P_n n_n = n_i^2$$
$$P_n = \frac{n_i^2}{N_D}$$

③