CK5 (not on checklist) — Pts — December 2nd

| | |
|---|---|
| 1. Born-Haber/lattice energy | 12 |
| 2. Gases | 34 |
| 3. liquids | 27 |
| 4. solids | 17 |
| | 90 |

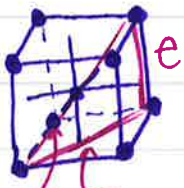
fcc
389 pm
atomic radius

* closest way to pack stuff!

**simple**

* $e = 2r$
* 1 atom/unit cell

**body-centered**




$\sqrt{2}e$

* $4r = \sqrt{3}e$
* 2 atoms/unit cell

**face-centered**


* $4r = \sqrt{2}e$
* 4 atoms/unit cell
  - 8 * 1/8 corners
  - 6 * 1/2 face centered

* big ions = USUALLY anions

1 big ion/unit cell | 2 big ions/unit cell | 4 big ions/unit cell

$V = e^3$

$density = \frac{m}{V}$ (* of one unit cell)

- 1 * AM/$N_A$ simple
- 2 * AM/$N_A$ bcc
- 4 * AM/$N_A$ fcc (of one unit cell)

↳ e-e↳r

→ octahedral hole: space surrounded by 6 atoms
↳ from FCC

→ tetrahedral hole:
↳ 8 holes in every fcc unit cell

December 2nd

1.55 g/L @ 300K 99.4 kPa
400K 107 kPa

$$\frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$$

$$\frac{PVMM}{MT} = \frac{PVMM}{MT}$$

$$\frac{PMM}{dT} = \frac{PMM}{dT}$$

| | ① | ② |
|---|---|---|
| P | 99.4 kPa | 107 kPa |
| ~~MM~~ | | |
| d | 1.55 | $d_2$ |
| T | 300K | 400K |

p. 225 (in textbook)

$K(s) \rightarrow K(g)$ $\Delta H = +89$ kJ/mol

$K(g) \rightarrow K^+(g) + e^-$ $\Delta H = +419$ kJ/mol

$\frac{1}{2} * F_2(g) \rightarrow F(g)$ $\Delta H = +159$ kJ $* 1/2$

$F(g) + e^- \rightarrow F^-(g)$ $\Delta H = -329$ kJ

lattice energy → $K^+(g) + F^-(g) \rightarrow KF(s)$ $\boxed{\Delta H_{\text{lattice energy}} = -821 \text{ kJ}}$

$K(s) + \frac{1}{2}F(g) \rightarrow KF(s)$ $\Delta H_f^\circ = -567$ kJ

FCC (ionic)

4 large ions/unit cell
↳ $(8 * \frac{1}{8} + 6 * \frac{1}{2})$

4 oct. holes/unit cell
↳ 12 edge-centers, each 1/4 in = 3
+1 in body-centered position

8 tetrahedral holes

fcc $Na_2S$