

Notes 01/25

Friday, January 25, 2008
10:00 AM



Notes 0125

Audio recording started: 10:00 AM Friday, January 25, 2008

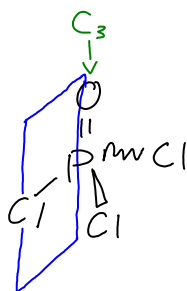
- Point groups

- Example



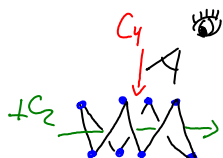
has C_2
 $\perp C_2$? $\rightarrow$ no
 mirror plane? $\rightarrow$ yes σ_h
 so point group: C_{2h}

- Example

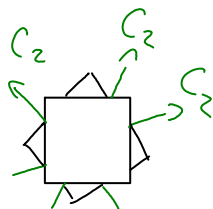


has C_3
 $\perp C_2$? $\rightarrow$ no
 mirror plane? yes σ_v
 so point group: C_{3v}

- Example S_8 crown structure

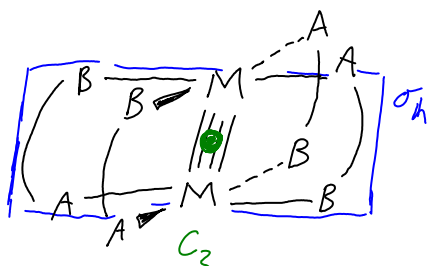


redraw



C_4
 $\perp C_2$
 $\sigma_d \rightarrow D_{4d}$

- Example



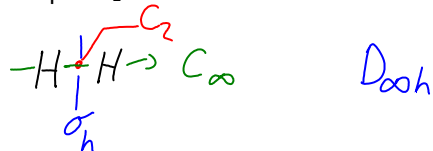
rotation axis? $\rightarrow C_2$
 $\perp C_2$? $\rightarrow$ no
 mirror plane? σ_h
 point group: C_{2h}

*all angles are 90°

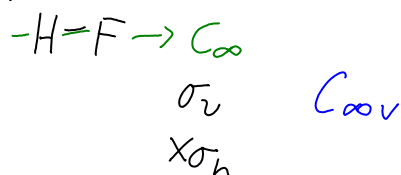
- Special point groups:

- Low symmetry point groups:

- Example: H_2



- Example: HF



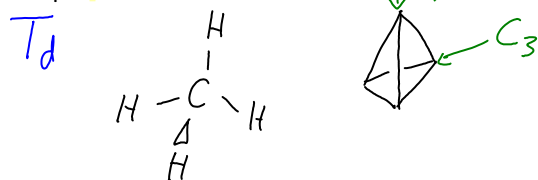
- Low symmetry point groups:

C_1	C_s	C_i
E	Mirror plane	Inversion center

- High symmetry point groups:

T_d	O_h	I_h
Contain multiple C_3	Contain multiple C_3	Contain multiple C_3

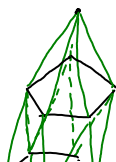
- Example: Methane CH_4



- O_h



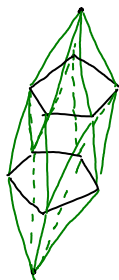
- I_h



Icosahedron

Elemental form of boron is based on icosahedra with boron at each point. $B_{12}H_{12}^{2-}$

- I_h



Icosahedron

Elemental form of boron is based on icosahedra with boron at each point. $B_{12}H_{12}^{2-}$

- S_n (low symmetry)

- S_4 : C_2 , S_4

- S_6 : C_3 + S_6

- Find point group of a tennis ball.

- Bonding in materials**

- Bonding in solids**

- 1. Ionic bonding**

- ☐ NaCl, $CaCl_2$, KNO_3

- ☐ Usually made from electropositive and electronegative element

- ☐ Electrostatic interactions

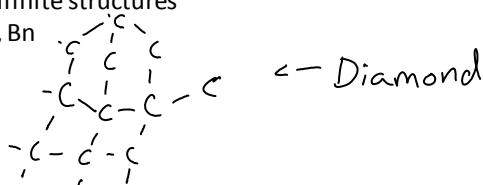
- ☐ Non-directional

- ☐ Tend to be soluble in water... every single chem class teaches how polar water interacts with NaCl to dissolve it... meh

- 2. Extended Covalent solids**

- ☐ Infinite structures

- ☐ C, Bn



- 3. Molecular Solid**

Continue next lecture