Day 11

→ mathematical framework → Lattice → Directions

↓ ↓

Understanding of how to deal with crystals

Reciprocal → planes

Symmetry → 14 Bravais Lattices

A lot more of what we know as **crystal structures**

→ Variety of crystal structures:

→ what is the effect on the symmetry of the lattice → crystal structure

↓

addition of motif to the lattice point(s)

→ molecule or motif does not possess the symmetry of the lattice.

cP lattice – Single spherical atom (Hard sphere model)

↓

Simple cubic crystal structure

→ A linear A-B molecule that has a certain bond length < lattice parameter.

→ Lattice + motif → crystal structure

For primitive tetragonal:

A atoms (0, 0, 0)
B atoms (0, 0, $\bar{z}$)
↳ fractional coordinate

→ Bonding Pattern

☆ Examples from energy:

→ Electro catalyst* for Hydrogen Evolution Reaction (HER)
↓
H_2O } water-splitting thermodynamic part → Supplying energy

does not occur at an appreciable rate that is useful to us.
↓
kinetic part (catalyst)

* Platinum → understanding why and how.

(110) > (111) > (100)
→ decreasing order of activity

Why?

→ orientation of H_2O molecules
→ Adsorption of H_2O
→ Different of Pt atoms (Planar density)