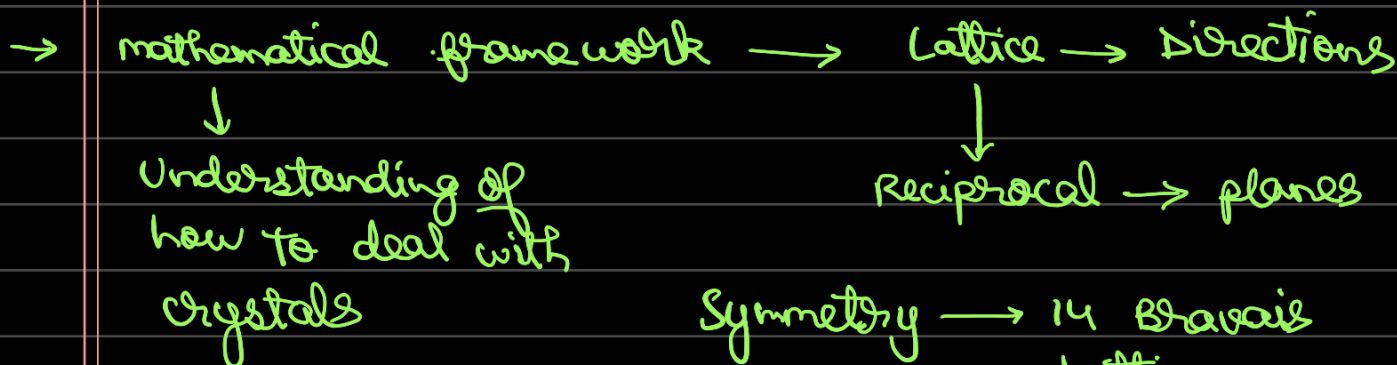
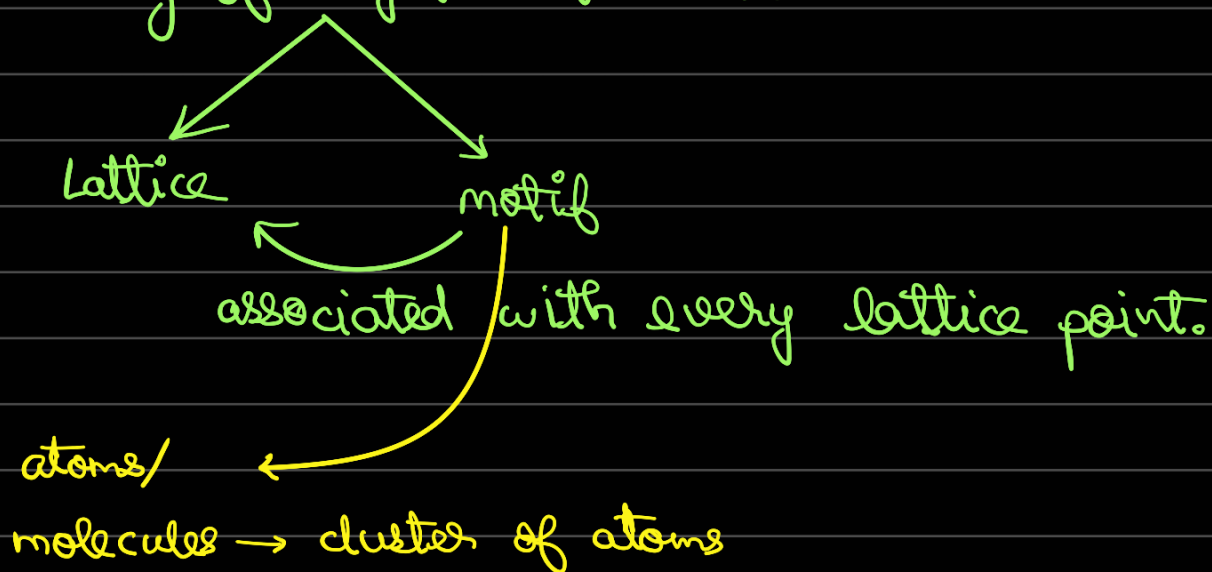


## Day 11



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  $\rightarrow$  crystal structure

For primitive tetragonal:

A atoms  $(0, 0, 0)$

B atoms  $(0, 0, \frac{1}{2})$

$\rightarrow$  fractional coordinate

→ Bonding Pattern

☆ Examples from energy:

→ Electro catalyst<sup>\*</sup> for Hydrogen Evolution Reaction (HER)

$\downarrow$  } water-splitting  
 $H_2O$  } thermodynamic part  $\rightarrow$  Supplying energy

does not occur at an appreciable rate that is useful to us.

$\downarrow$   
kinetic part  
(catalyst)

\* Platinum  $\rightarrow$  understanding why and how.

$(110) > (111) > (100)$

$\xrightarrow{\hspace{1cm}}$   
decreasing order of activity

Why?

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- orientation of  $\text{H}_2\text{O}$  molecules
- Adsorption of  $\text{H}_2\text{O}$
- Diffusion of Pt atoms (Planar density)

