

Day 12

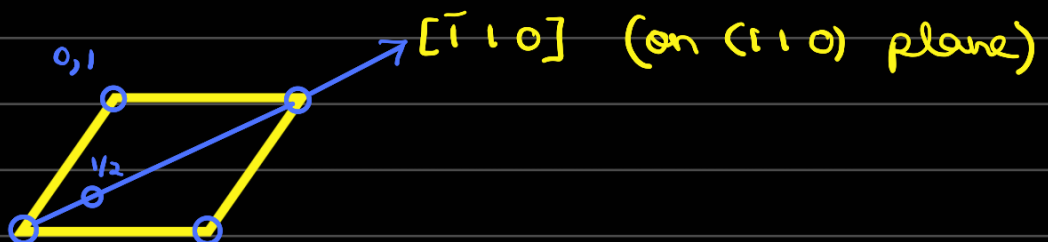
- Activity of HER at different surfaces of the electrocatalyst - Pt
- Low-index planes: (001) (011) (111)
↓
Indexes upto 3
- Plane with highest atom density (Planar density)
- Line with highest atom density (Linear density)
$$= \frac{\text{No. of atoms}}{\text{length of line seg.}}$$
- Problem:

hp lattice; $a = 3.6 \text{ \AA}$, $c = 5.7 \text{ \AA}$

atoms at $(0,0,0)$ and $(2/3, 1/3, 1/2)$

linear density along $[\bar{1}10] = ?$
Planar density along $(110) = ?$

Ans)



$$\text{length} = 3 \times \text{len}([\bar{1}10])$$

$$\text{No. of atoms} = \frac{1}{2}(1+1) + 1+1$$

$$= 3$$

so linear density = $\ln [\bar{1} \ 0]$

Planes

$$\text{no. of atoms} = 4 \times \frac{1}{4} + 4 \times \frac{1}{2} + 3$$

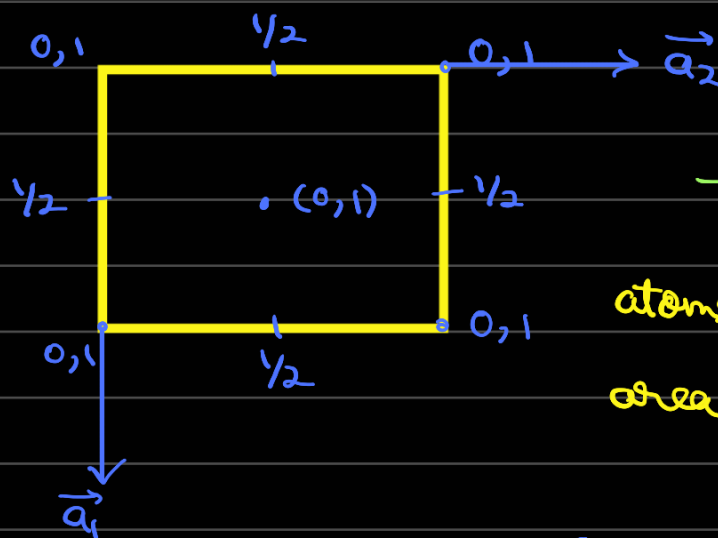
$$= 6$$

$$\text{Area} = |3 [\bar{1} \ 0]| \cdot |[0 \ 0 \ 1]|$$

→ Problem :

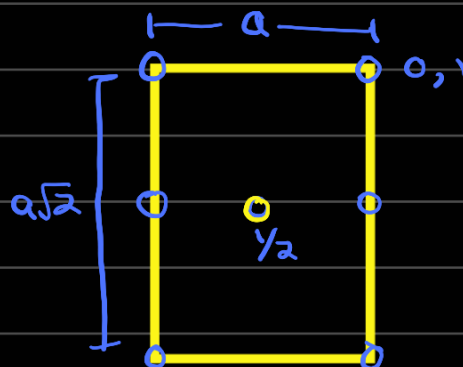
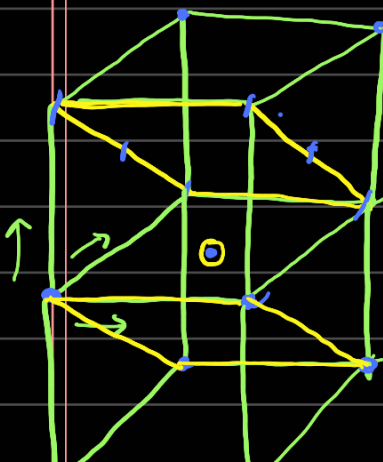
$$\text{CF, } a = 3.9 \text{ \AA}$$

atoms (Pt) at $(0,0,0) \rightarrow \text{motif} \rightarrow \text{single Pt atom}$



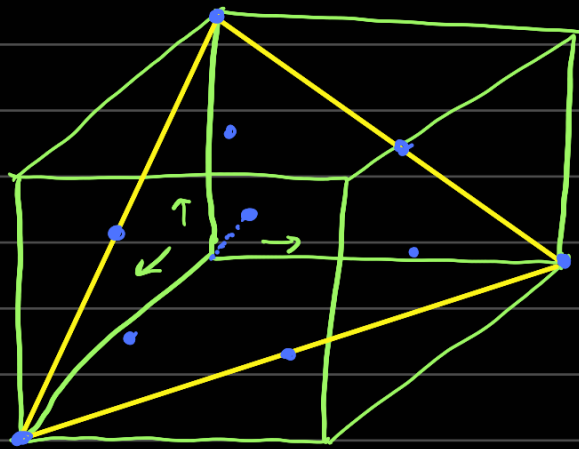
$$\text{atoms} = 4 \times \frac{1}{4} + 1 = 2$$

$$\text{area} = a^2$$



$$\text{area} = \sqrt{2} a^2$$

$$\text{atoms} = 4 \times \frac{1}{4} + 2 \times \frac{1}{2} = 2$$



$$\text{atoms} = 3 \times \frac{1}{4} + 3 \times \frac{1}{8}$$

