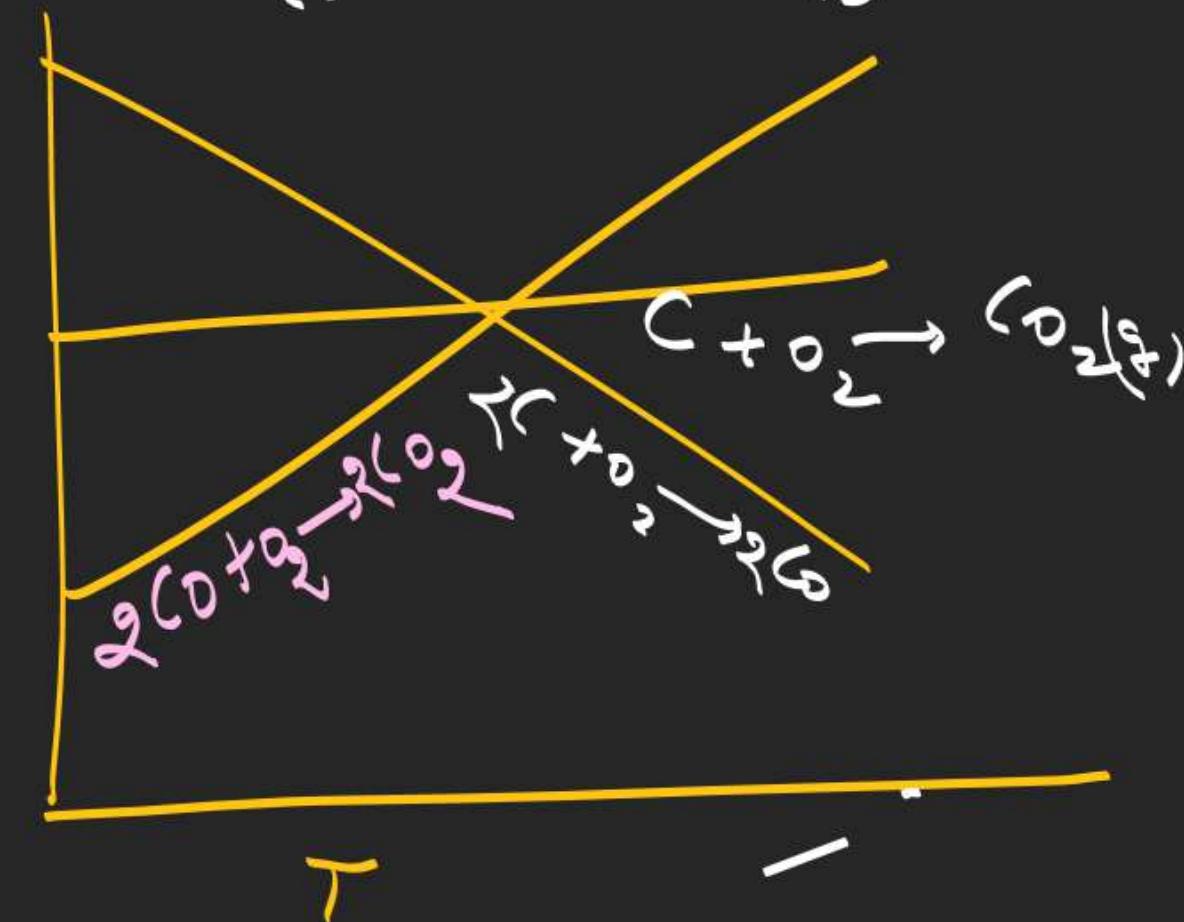


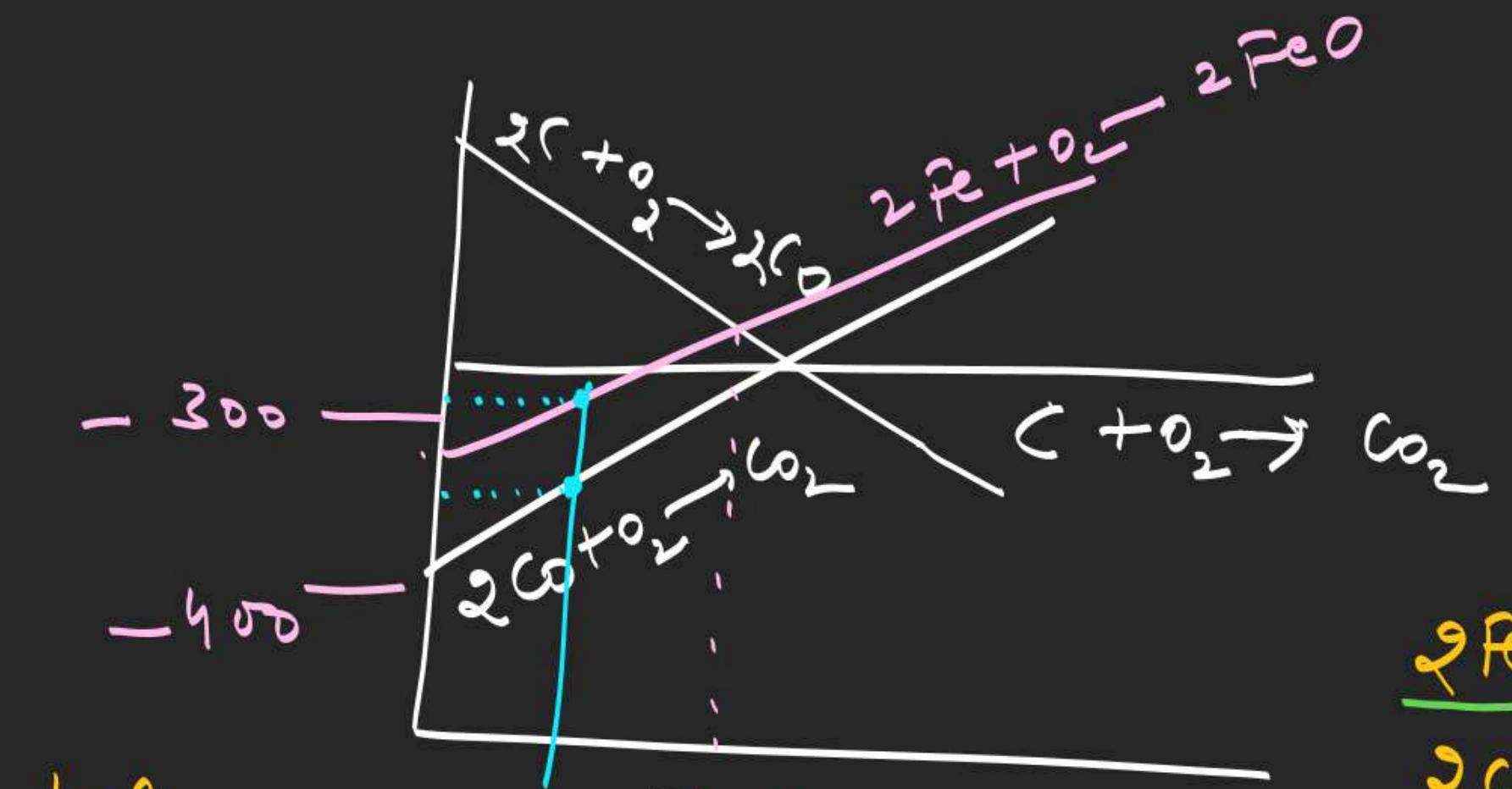
# Ellingham Dia.



$$\boxed{\Delta G = \Delta H - T \Delta S}$$

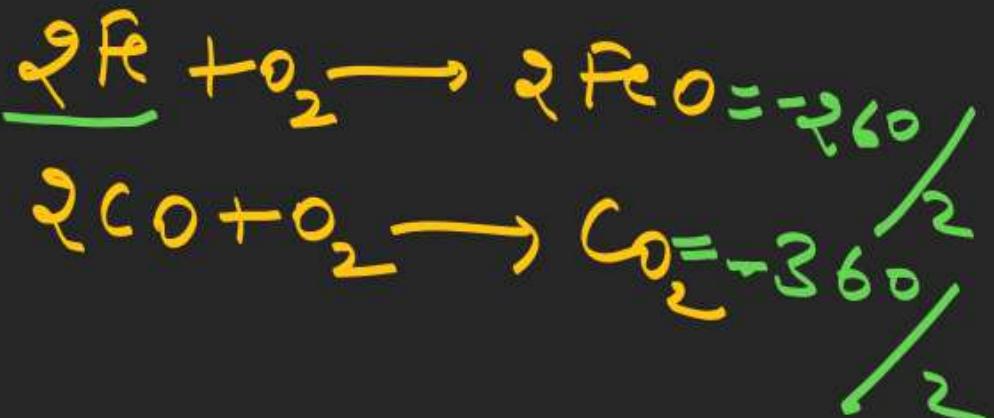
$$\Delta S = P - R \Delta G$$





$$\Delta G = \frac{260}{2} - \frac{360}{2}$$

$\Delta G = -\text{ive}$

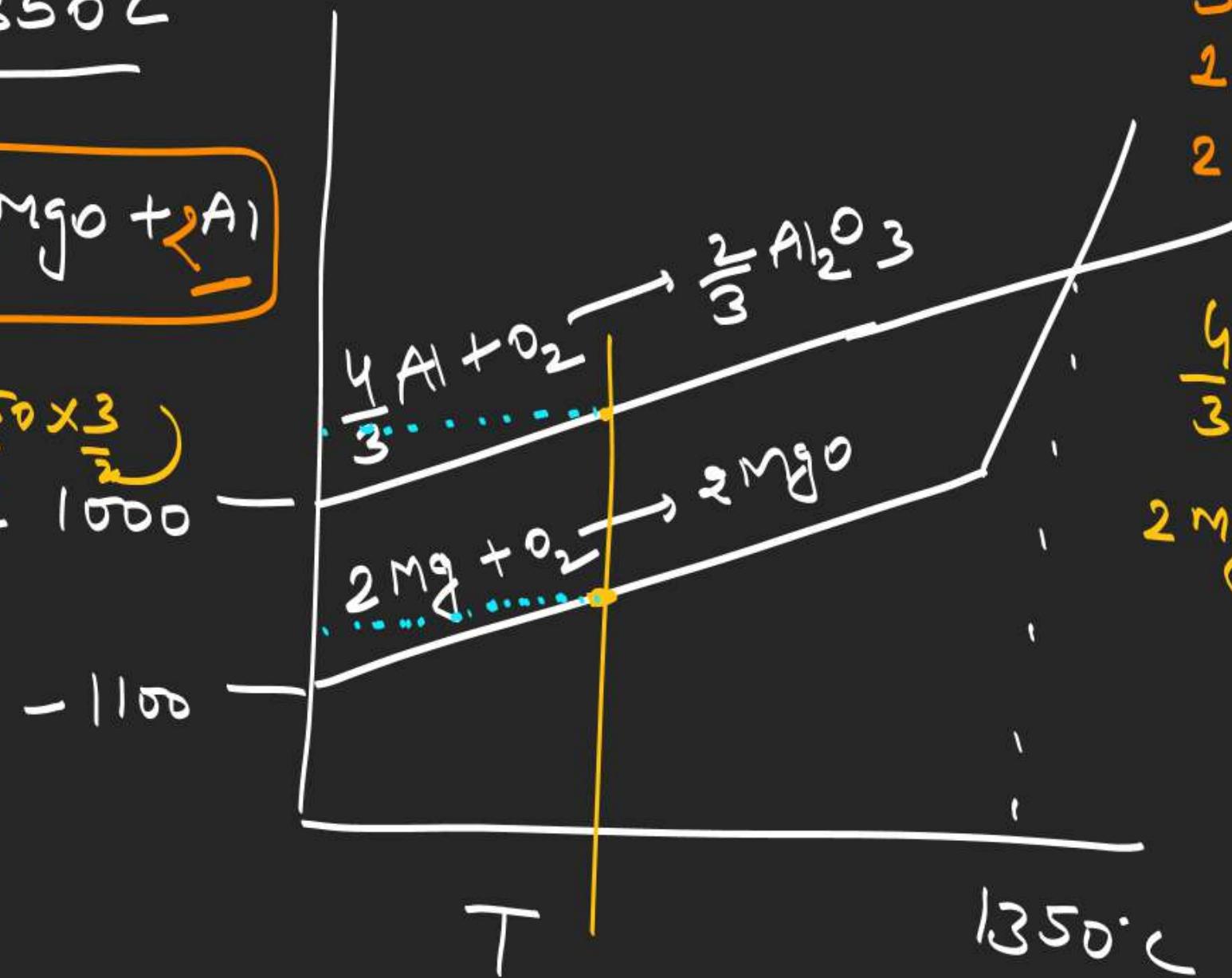


below  $1350^{\circ}\text{C}$



$$\Delta G = f\left(\frac{950 \times 3}{2}\right) - \left(\frac{1050 \times 3}{2} - 1000\right)$$

$$= \boxed{\Delta G = -\text{line}}$$



$$\frac{4}{3} \text{ Al} \longrightarrow -950$$

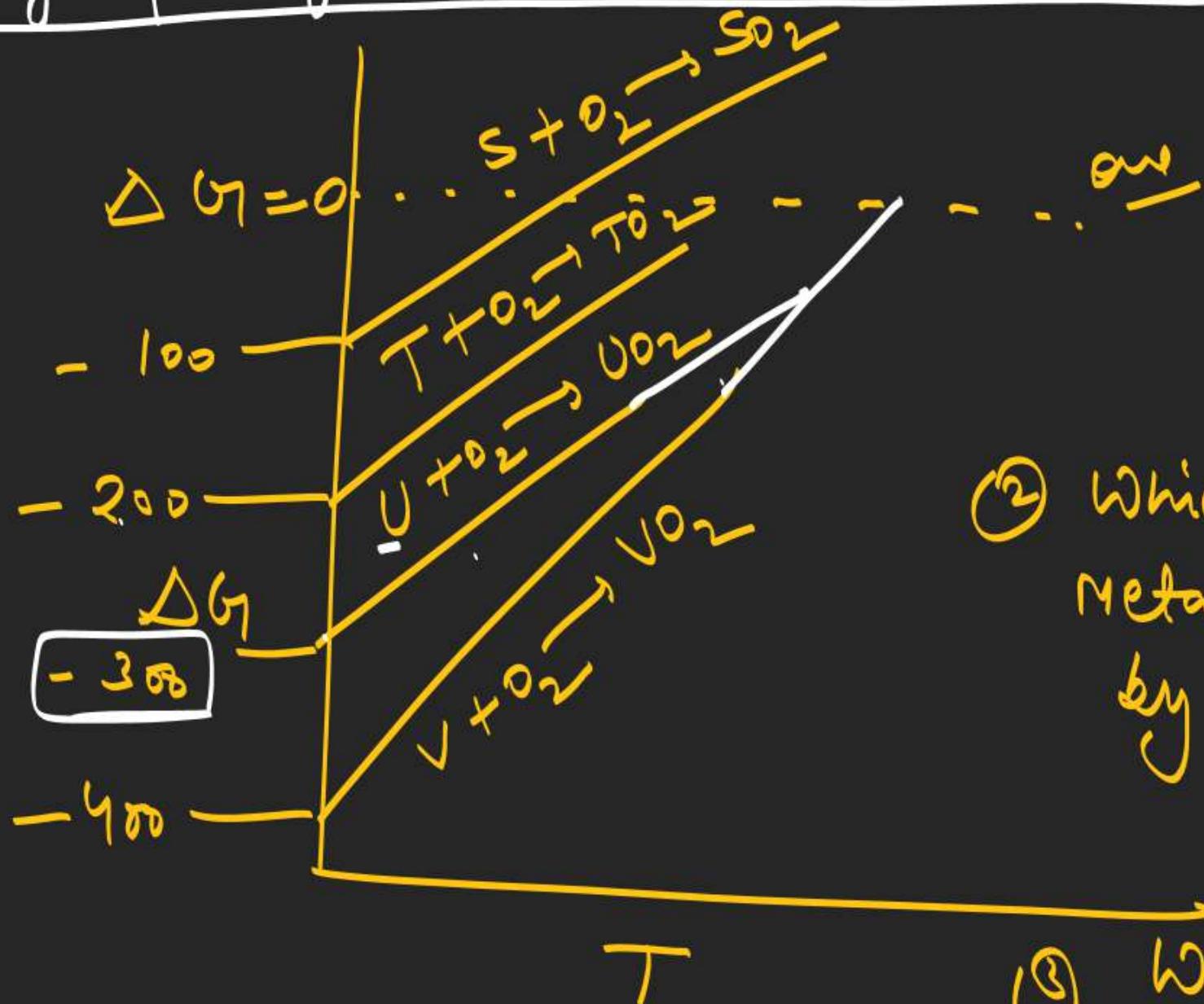
$$1 \text{ Al} \longrightarrow \frac{950 \times 3}{4}$$

$$2 \text{ Al} \longrightarrow \frac{950 \times 3 \times 2}{4}$$

$$\frac{4}{3} \text{ Al} + \text{O}_2 \longrightarrow \frac{2}{3} \text{ Al}_2\text{O}_3 = -(950 \times \frac{3}{2})$$

$$2 \text{ Mg} + \text{O}_2 \longrightarrow 2 \text{ MgO} = \left( \frac{1050}{2} \times 3 \right)$$

graphs for metal to metal oxide



Which of the following metal oxide decompose first?

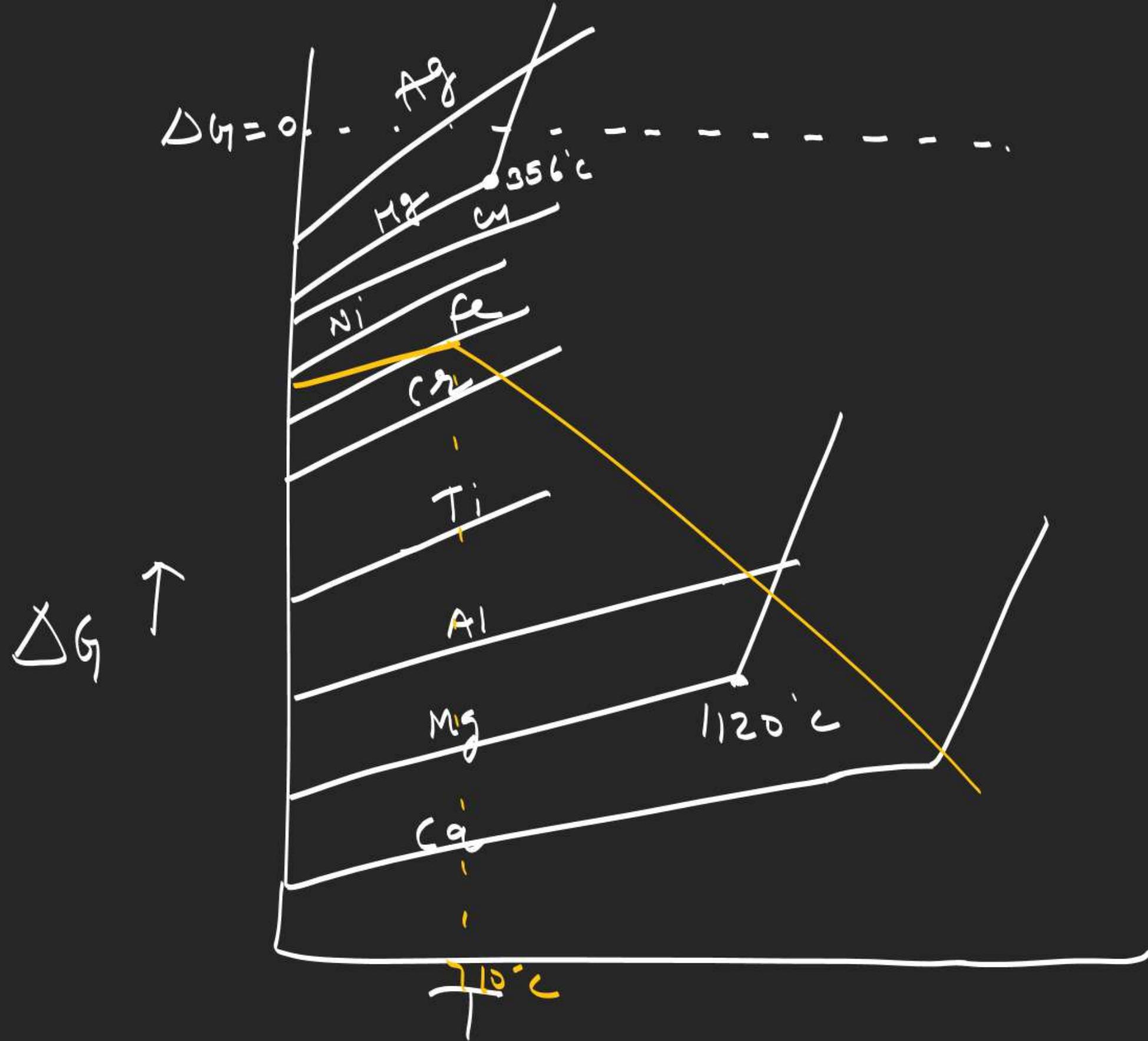
$\text{SO}_2$

② Which of the following metal oxide easily reduced by U metal?

$\text{TiO}_2, \text{SO}_2$

③ Which of the following metal oxide will reduced by U metal only at high temp.

$\text{VO}_2$

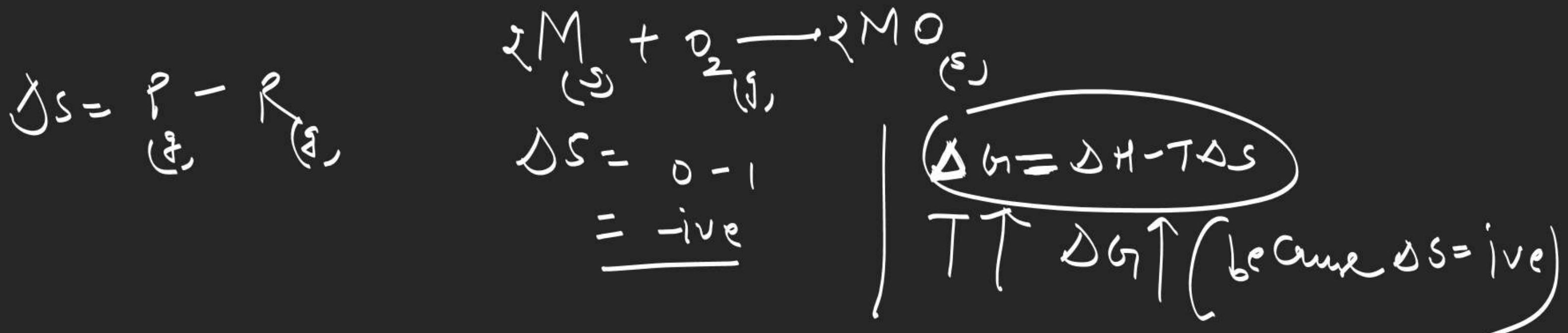


- ①  $\Delta H/T$  lines upwards  
because when  $T \uparrow \Delta H \uparrow$
- ②  $\Delta H/T$  all line follow  
straight line unless  
material melt or vapourise  
(example)  $Hg \rightarrow HgO$  line (vap) ( $356^\circ C$ )  
 $Mg - MgO$  line (vap) ( $1100^\circ C$ )

①  $\Delta H/T$  Diagram Called Ellingham Dia.

② graphs are given for metal to metal oxide  
metal to metal sulphide  
metal to metal halide

but above graphs are given for metal to metal oxide.

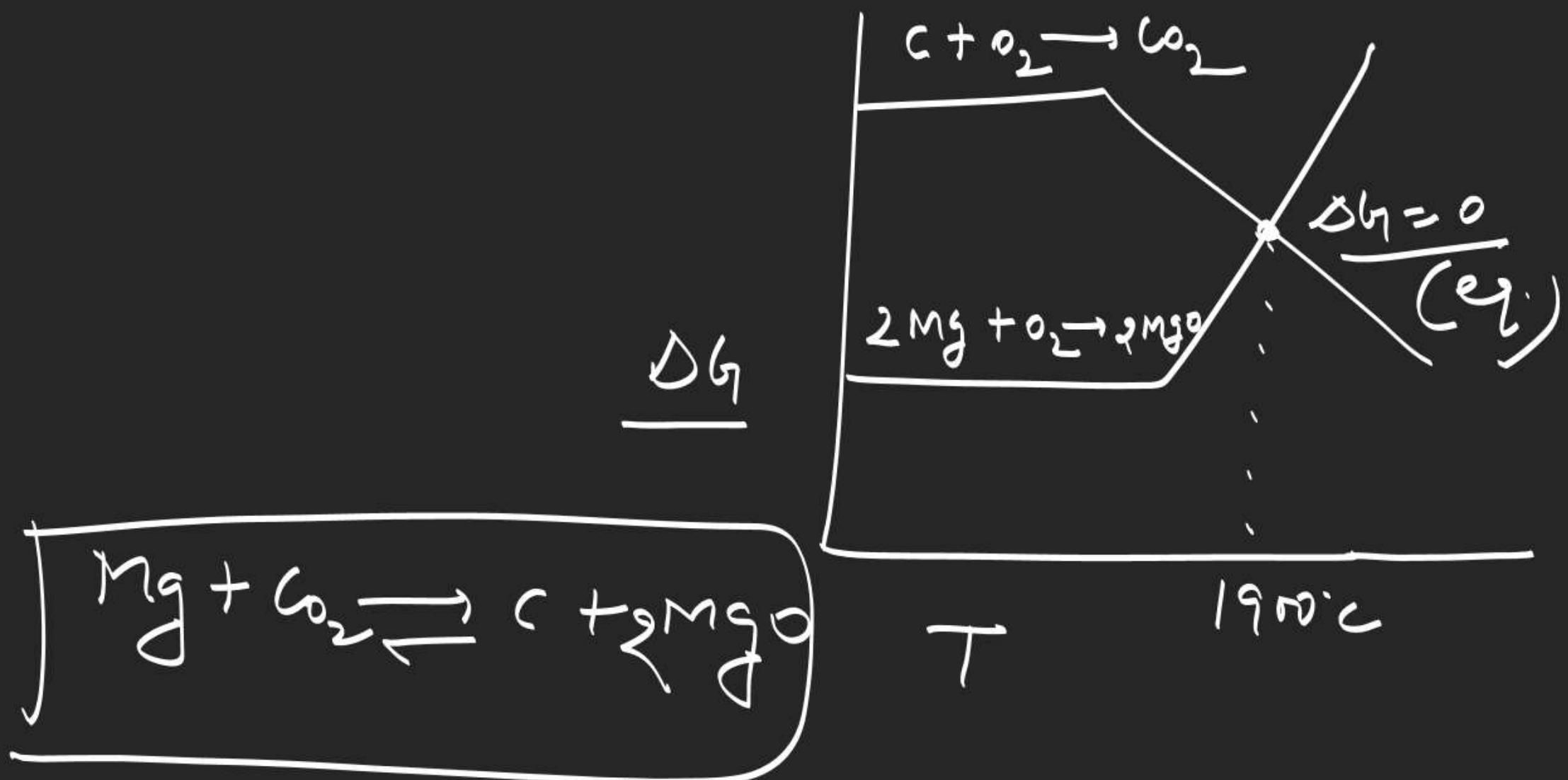


- Metal can reduce oxide of other metal which lie above it in Ellingham diagram
- Carbon is good reducing agent for metal oxide but at high temp. it can form carbide with some metals

one

hydrogen is good reducing agent  
but it is not widely used in  
metallurgical processes.

- ① Hydrogen graph above from many metal
- ②  H<sub>2</sub> line runs parallel with  
many metals
- (3) Hydrogen can form hydride with many metal
- (4) hydrogen gives explosive reaction with O<sub>2</sub> at  
high temp.

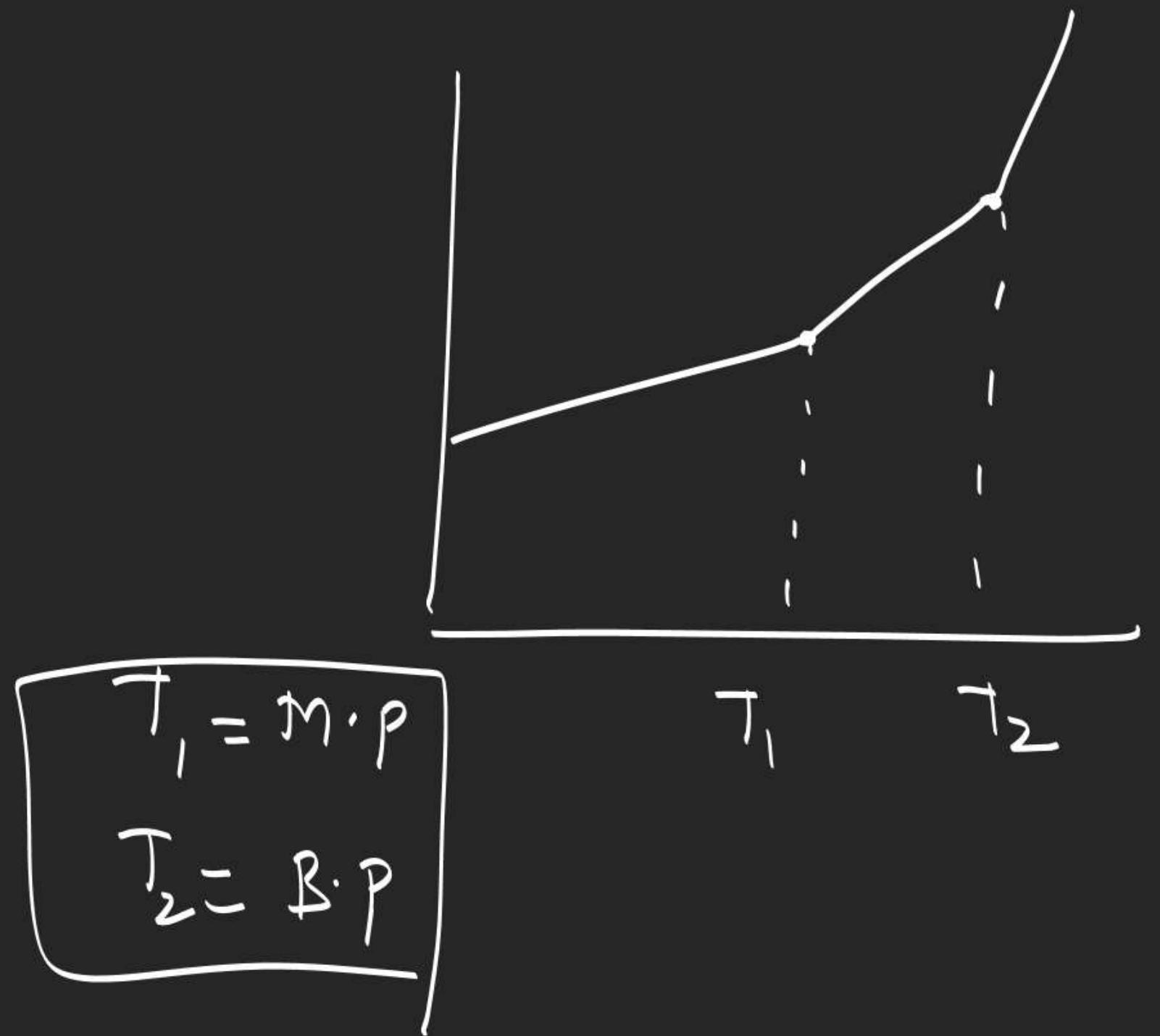


Ques

Why  $\text{Fe}_2\text{O}_3$  not reduced by C at room temp.

Ans -

reaction req. Certain amount  
of activation energy to  
start.



# Chromatography

adsorbant  
↓  
 $\text{Al}_2\text{O}_3 \quad \text{SiO}_2$



