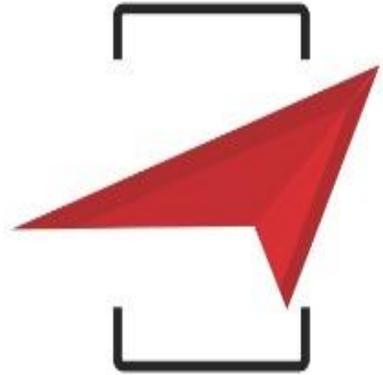


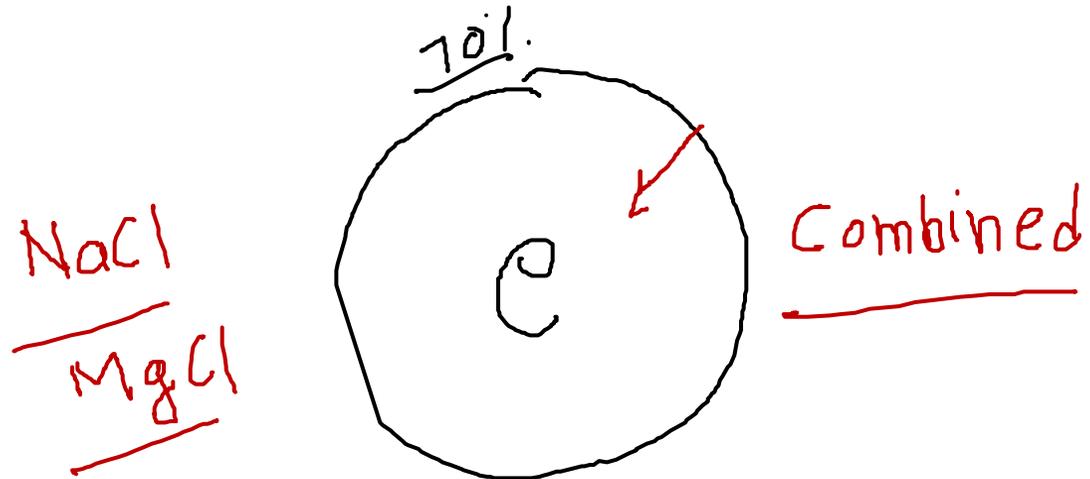
✓ metal ✓  
\_\_\_\_\_

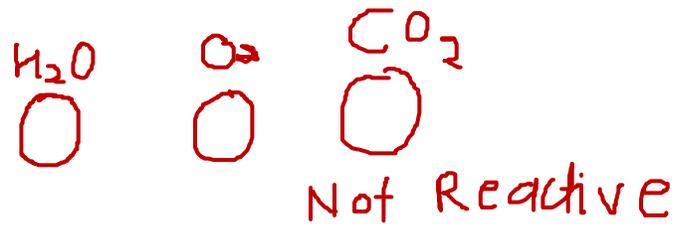


# SAFALTA CLASS™

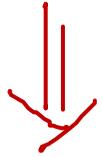
An Initiative by **अमर उजाला**

# SOURCE OF METALS



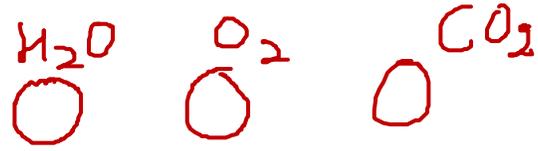


Gold (सोना)



Free State

Pure form



Sodium (Na)



Combined form

# Important Mineral and Ores

ଉପାଦାନ

ଉପାଦାନ

**MINERAL** : A mineral is a Natural substance as coal, Salt, Oil etc specially one that is found in the ground

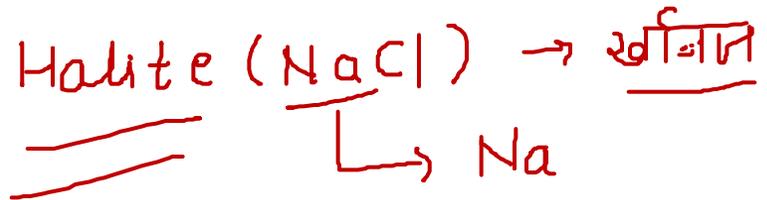
କାଠ, ଲୁଗା

Some minerals also present in food and drink and are very important for good health

Elements found in earth in the form of minerals

## • For Example

1. Halite से Na, Halite commonly Known as rock salt is a type of salt, the mineral natural form of sodium chloride (NaCl)



2. Al<sub>2</sub>O<sub>3</sub>.xH<sub>2</sub>O (hydrated aluminum oxide) Bauxite से Aluminium

- Earth is the main source of minerals and ores. Most elements are not found independently due to their reactive tendencies.
- Potassium (K) Sodium (Na) Calcium (Ca) Magnesium (Mg) Aluminum (Al) Zinc (Zn) Iron (Fe) Lead (Pb), etc. metals are found in the compound form.
- Mineral is natural material. In which metals and their compounds are found in the earth.

# पृथ्वी की भूपटल (EARTH'S CRUST) में धातुओं की प्रचुरता

अधातु 1. Oxygen	46.6%	उपधातु (metalloid) 2. Silicon	27.7%
धातु 3. Aluminum	8.1 %	4. Iron	5%
5. Calcium	3.6%	6. Sodium	2.8%
7. Potassium	2.6%	8. Magnesium	2.1%

# ORES

- Ores are that minerals from which we can found or extract economically and valuable metal.

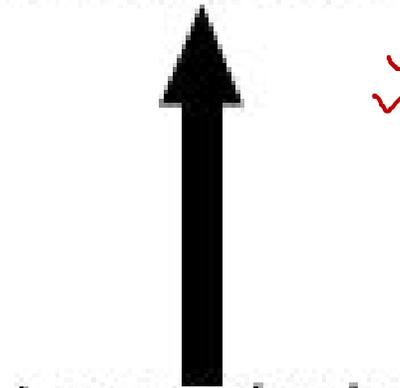
→

## अयस्क के कुछ मुख्य रूप

- 1. Oxide Ore** ✓  
⇒ ऑक्साइड अयस्क से Al, Cu, Fe, Sn निकाले जाते हैं
- 2. Carbonate Ore**  
⇒ कार्बोनेट अयस्क से Ca, Zn, Fe निकाले जाते हैं
- 3. Sulphide Ore**  
⇒ सल्फाइड से Zn, Cu, Pb, Hg जस्ता तांबा लेड पारा
- 4. Halide Ore**  
⇒ हैलाइड अयस्क से सोडियम, फ्लोराइड चांदी निकाले जाते हैं
- 5. Sulphate ore** सल्फेट अयस्क

# Reactivity series of metals

Most reactive



Least reactive

K	Potassium
Na	Sodium
Ca	Calcium
Mg	Magnesium
Al	Aluminium
<b>C</b>	<b>Carbon</b>
Zn	Zinc ✓
Fe	Ferum ✓
Sn	Tin ✓
Pb	Lead ✓
Cu	Copper ✓
Hg	Mercury ✓
Ag	Silver ✓
Au	Gold ✓

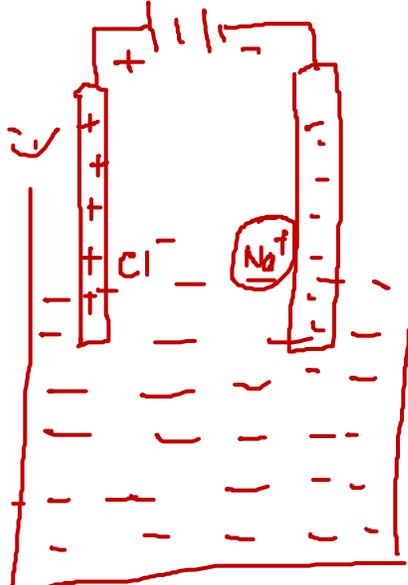
Extract by electrolysis

Extract by carbon reduction

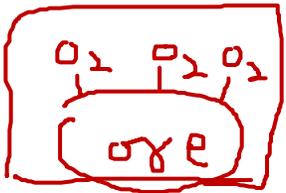
Heating directly in air

Found as natural element

① NaCl



⇒ molten form



oxide

Roasting

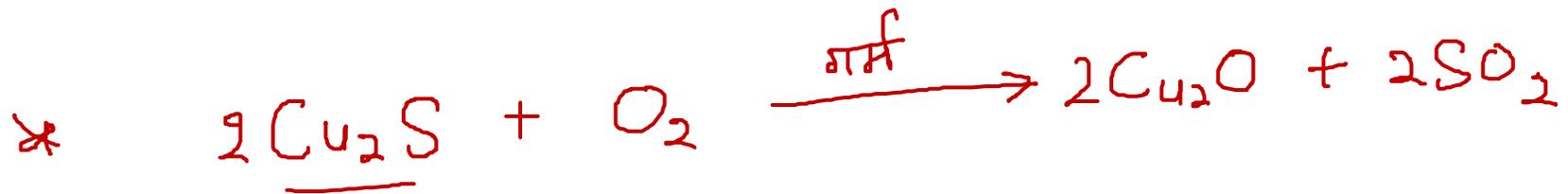
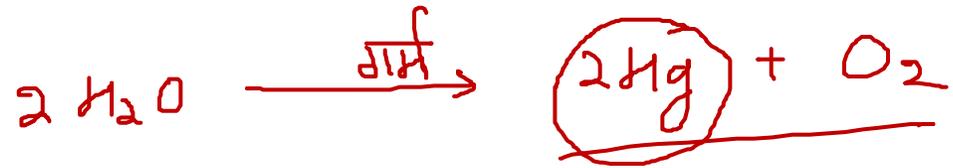
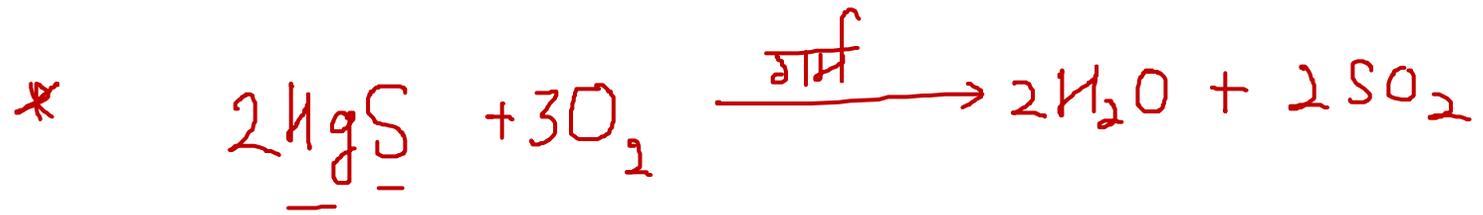


② Calcination

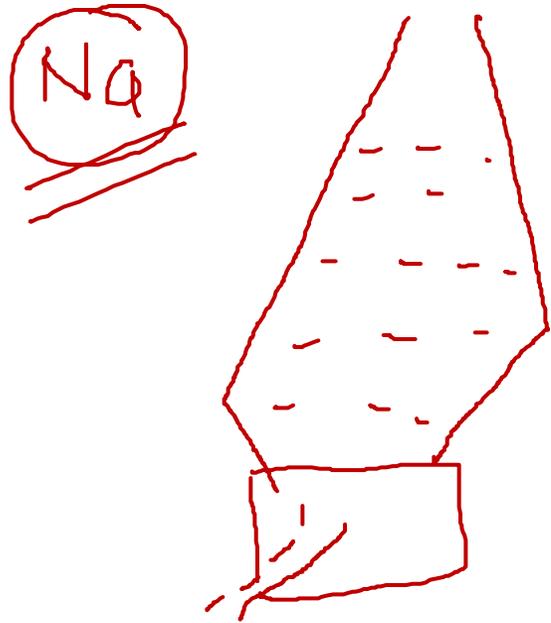


oxide  $\xrightarrow{\text{heat}}$  metal

ore  $\longrightarrow$  oxide  $\xrightarrow{\text{heat}}$  metal

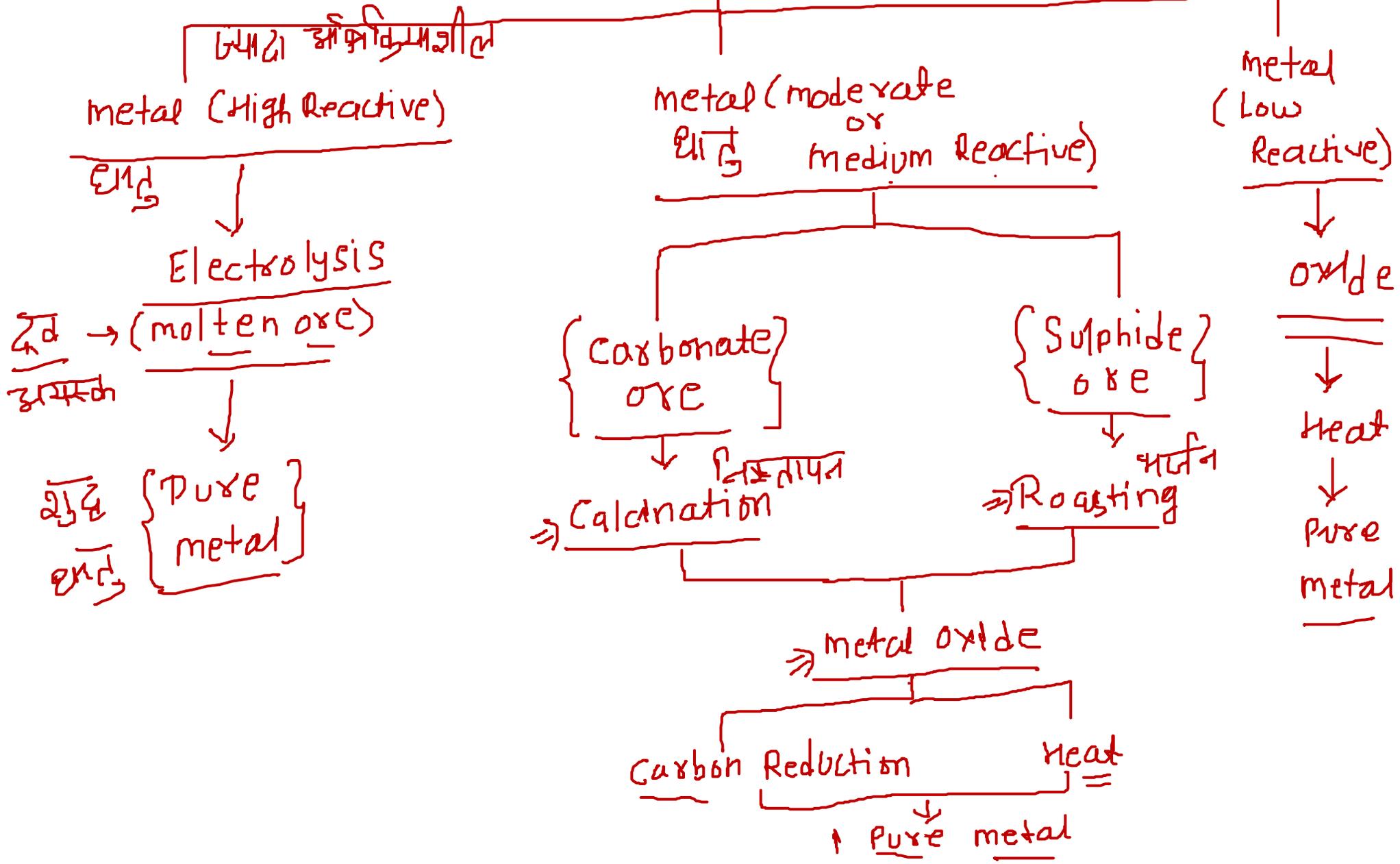


# \* Coke Reduction or Carbon Reduction



metal  
(molten form)

# ORE (अम्ल)



Patinum → Pentlandite

↓  
Cu, Ni

Byproduct

Imp. **IMPORTANT ORES (महत्वपूर्ण)**

→ **1. IRON लोहा(Fe)**

→ (i) Hematite ✓ (हेमेटाइट)	→ $Fe_2O_3$
→ (ii) Limonite ✓ (लिमोनाइट)	→ $FeO(OH).nH_2O$
→ (iii) Magnetite ✓ (मैग्नेटाइट)	$Fe_3O_4$ ✓ → प्राकृतिक चुम्बक
→ (iv) Iron Pyrite ✓ (आयरन पाईराइट)	$FeS_2$
→ (v) Copper Pyrites (काँपर पाईराइट) ✓	$CuFeS_2$ → ✓✓
→ (vi) Siderite (सीडेराइट)	$FeCO_3$

→ **2. SODIUM सोडियम( $Na$ )**

→ Sodium Nitrate X

(i) Chile Salt Peter ✓ (चिली साल्ट पीटर)	$NaNO_3$
(ii) Borax ✓ (बोरेक्स / सुहागा)	$Na_2[B_4O_5(OH)_4] \cdot 8H_2O$
(iii) Common Salt (साधारण नमक)	$NaCl$
(iv) Trona (ट्रोना)	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$
✓✓	

### 3. ALUMINIUM एल्यूनियम (Al)

(i) Cryolite ✓	(क्रायोलाइट)	$\text{Na}_3\text{AlF}_6$
✓ (ii) Alunite ✓	(एल्युनाइट)	$\text{KAl}_3(\text{SO}_4)_2(\text{OH})_6$
✓ (iii) Corundum ✓✓	(कोरंडम)	$\text{Al}_2\text{O}_3$
(iv) Kaolinite/Kaoline ✓	(काओलीन)	$\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$

### → 4. POTASSIUM (K) ✓✓

(i) Carnalite ✓	(कारनेलाइट)	$\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$
(ii) Salt Peter/Nitre ✓	(साल्ट पीटर)	$\text{KNO}_3$

## 5. MAGNESIUM (Mg) ✓

(i) Magnesite ✓	(मैग्नेसाइट)	$MgCO_3$
(ii) Dolomite ✓	(डोलोमाइट)	$MgCO_3 \cdot CaCO_3$
(iii) Carnalite ✓	(कारनेलाइट)	$KCl \cdot MgCl_2 \cdot 6H_2O$
(iv) Kieserite ✓	(किसेराइट)	$MgSO_4 \cdot H_2O$

## 6. CALCIUM (Ca) ✓

(i) Gypsum ✓	(जिप्सम)	$CaSO_4 \cdot 2H_2O$
(ii) Calcite ✓	(कैलसाइट)	$CaCO_3$
(iii) Asbestos ✓	(एस्बेस्टस)	$CaSiO_3 \cdot MgSiO_3$
(iv) Dolomite ✓	(डोलोमाइट)	$CaCO_3 \cdot MgCO_3$
(v) Fluorspar-Fluorite ✓	(फ्लुरस्पर)	$CaF_2$

## 7. COPPER (Cu)

Copper Glance also called Redruthite, chalcocite and vitreous copper

(i) Cuprite ✓	(क्यूपराइट)	$\text{Cu}_2\text{O}$
(ii) Copper Pyrite ✓	(काँपर पायराइट)	$\text{CuFeS}_2$
(iii) Copper glance ✓	(काँपर ग्लान्स)	$\text{Cu}_2\text{S}$
<del>(i) Cuprite ✓</del>	<del>(क्यूपराइट)</del>	<del><math>\text{Cu}_2\text{O}</math></del>

## 8. SILVER (Ag) ✓

(i) Ruby Silver/Pyrargyrite (रूबी सिल्वर)	$\text{Ag}_3\text{SbS}_3$
(ii) Horn Silver/Cerargyrite/Chlorargyrite (हॉर्न सिल्वर)	$\text{AgCl}$

## 9. GOLD सोना (Au)

(i) Sylvanite or silver gold telluride (सिल्वानाइट)	$[(\text{Ag}, \text{Au}) \text{Te}_2]$
(ii) Calaverite (कैलावराइट)	$\text{AuTe}_2$

## 10. ZINC जिंक/जस्ता (Zn)

(i) Zink blend (जिंक ब्लेंड)	ZnS
(ii) Zincite (जिनसाइट)	ZnO
(iii) Calamine (कैलामाइन)	ZnCO <sub>3</sub>

## 11. MANGANESE (Mn)

(i) Pyrolusite	(पाइरोल्युसाईट)	$MnO_2$
(ii) Magnite	(मैगनाईट)	$Mn_2O_3 \cdot 2H_2O$

## 12. URANIUM (U)

(i) Carnotite	(कार्नोटाइट)	$K_2 (UO_2)_2 (VO_4)_2 \cdot 3H_2O$
(ii) Pitch blende	(पिच ब्लैंड)	$U_3O_8$

## 13. MERCURY (Hg) *→ Imp.*

(i) Cinnabar/Cinnabarite/Mercury Sulphide (सिनेबार)	$HgS$
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## 14. TIN (Sn)

Reddish brownish or yellowish main ore of tin

(i) Cassiterite	(कैसिटराइट)	$SnO_2$
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## 15. LEAD (Pb)

(i) Galena also called [lean Glance]	(गैलेना)	$PbS$
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## 16. ANTIMONY (Sb)

(i) Stibnite Soft grey also called antimonite	(स्टिबनाइट)	$Sb_2S_3$
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## 17. CADMIUM (Cd) ✓✓

. CdS- Rare Greenockite Yellow Orangeto red brick  
Greenockite is a rare cadmium bearing metal sulphide

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## 18. COBALT (Co)

(i) Smelite (स्मैलाईट)		$CoAsS_2$
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## 19. NICKEL (Ni)

(i) Millerite – brassy in colour (मिलेराइट)		$NiS$
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