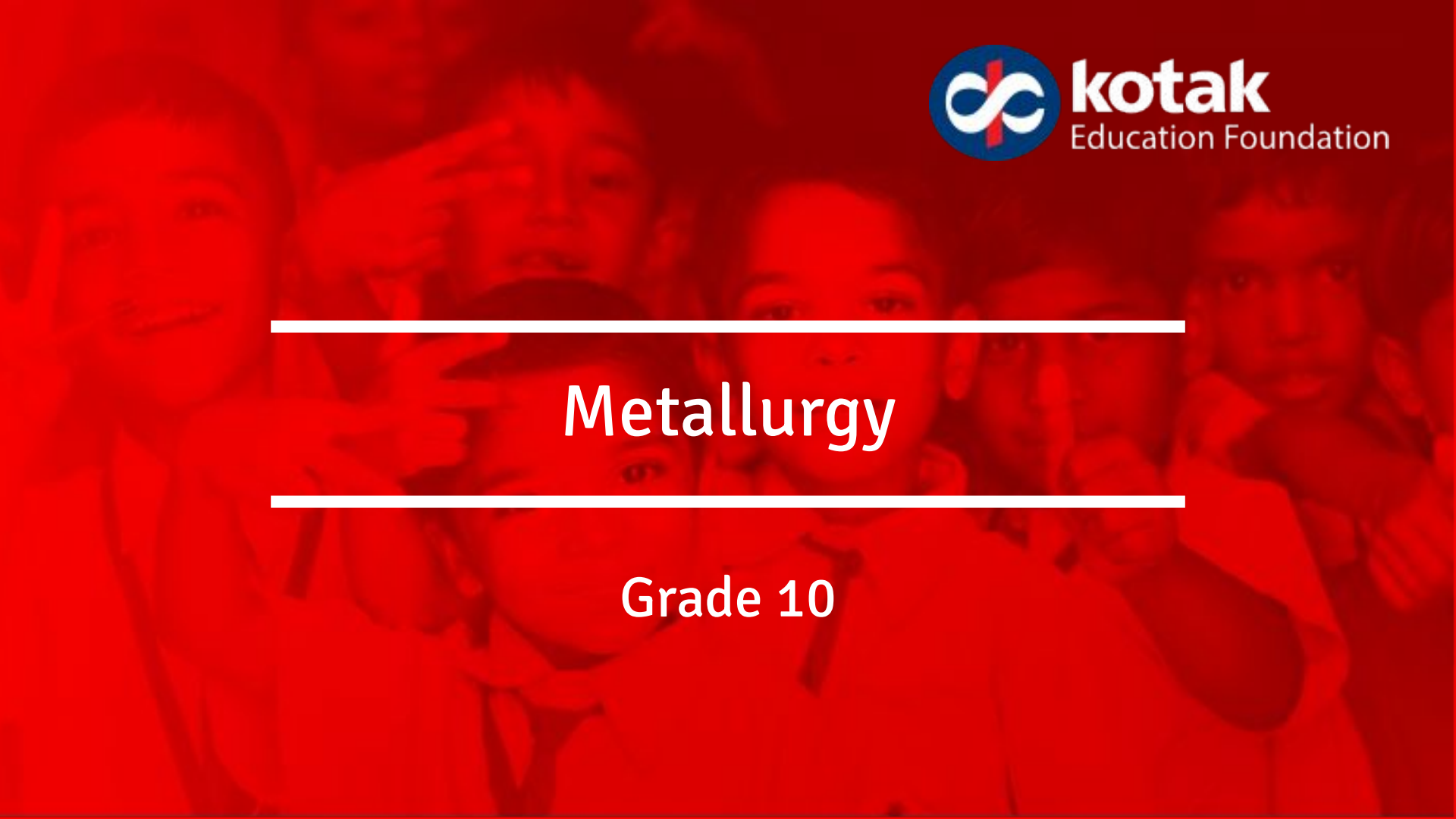

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Metallurgy

Grade 10

Metallurgy

Metallurgy

Metallurgy: The process used for extraction of metals in their pure form from its ores and then metals are further purified by various methods of purification. All the process is called metallurgy.

The major steps involved for the extraction of a metal from its ore are:

(i) Concentration of ores (or enrichment of ore)

(ii) Conversion of concentrated ore into metal

(iii) Refining (purification) of impure metal

Imp Give Reasons

Generally the ionic compounds have high melting points.

Answer

In an ionic compound there is strong electrostatic force of attraction between opposite charged ions. To overcome these forces a considerable amount of energy is needed. Therefore, ionic compounds have high melting points.

c. Sodium is always kept in kerosene.

Answer

Sodium is a very reactive metal. It vigorously reacts with atmospheric oxygen and catches fire. If it is kept in kerosene it does not react with kerosene and sinks in it. In kerosene, it does not come in contact with oxygen and prevent accidental fire.

d. Pine oil is used in froth flotation.

Answer

Pine oil is added in the froth flotation method to create froth or bubble so that metal can be purify easily because pine oil prevents the ore from gangue for further mixing. Pine oil also acts as best substance for forming froth for the minerals. It also increases the non wettability of mineral particles.

Important Definitions

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1.Ores

Answer

Ores: Those minerals from which a metals can be extracted conveniently and profitably.

Example : Bauxite ($Al_2O_3.H_2O.$) Cinnabar (HgS)

2. Minerals.

Answer

Minerals: The Naturally occurring compounds of metals along with other impurities are known as minerals.

Example :Rocks are composed of mixtures of minerals. Talc and granite are minerals.

3. Gangue

Answer

Gangue is the unwanted impurities like rock material, dust, soil, sand, earthy particles, limestone, mica etc. present in an ore.

Write names.

i. Alloy of sodium with mercury.

Answer

Sodium amalgam, commonly denoted as Na(Hg), it is an alloy of mercury and sodium.

ii. Molecular formula of the common ore of aluminium.

Answer

$Al_2O_3.nH_2O$.

iii. The oxide that forms salt and water by reacting with both acid and base.

Answer

Aluminium Oxide (Al_2O_3) can react both an acid as well as a base to produce salt and water.

iv. The device used for grinding an ore.

Answer

The device used for grinding an ore is grinding mill.

v. The nonmetal having electrical conductivity.

Answer

Graphite is a good conductor of electricity.

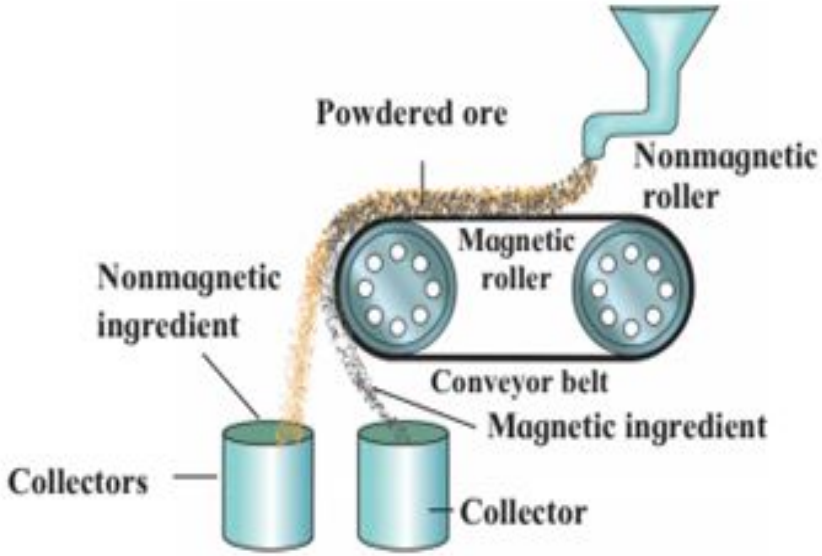
vi. The reagent that dissolves noble metals.

Answer

Aqua regia is 1:3 mixture of concentrated nitric and hydrochloric acids. It dissolves noble metals such as gold, and platinum.

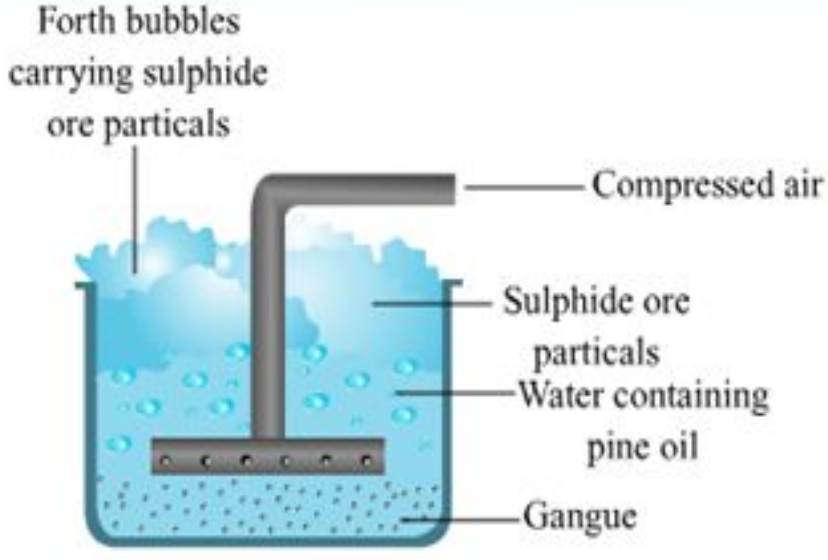
Diagrams

Magnetic separation method.



Magnetic separation

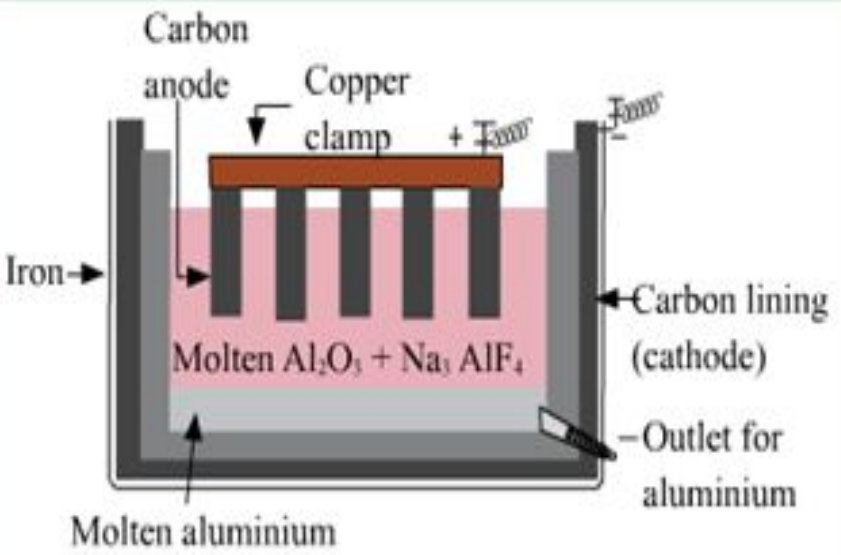
Froth floatation method.



Forth floatation process for the concentration of sulphide ores

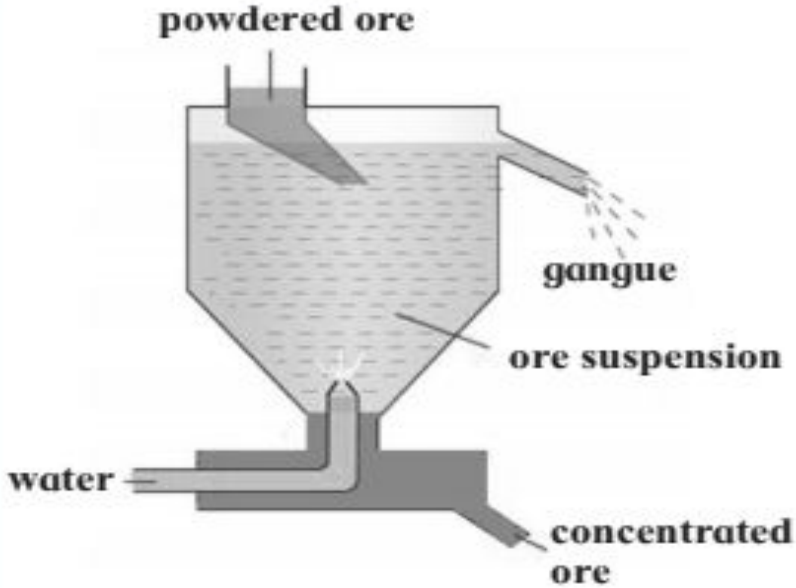
Diagrams

Electrolytic reduction of alumina.



Electrolytic cell for the extraction of aluminium

Hydraulic separation method.



Hydraulic separation

Reactivity of Metals

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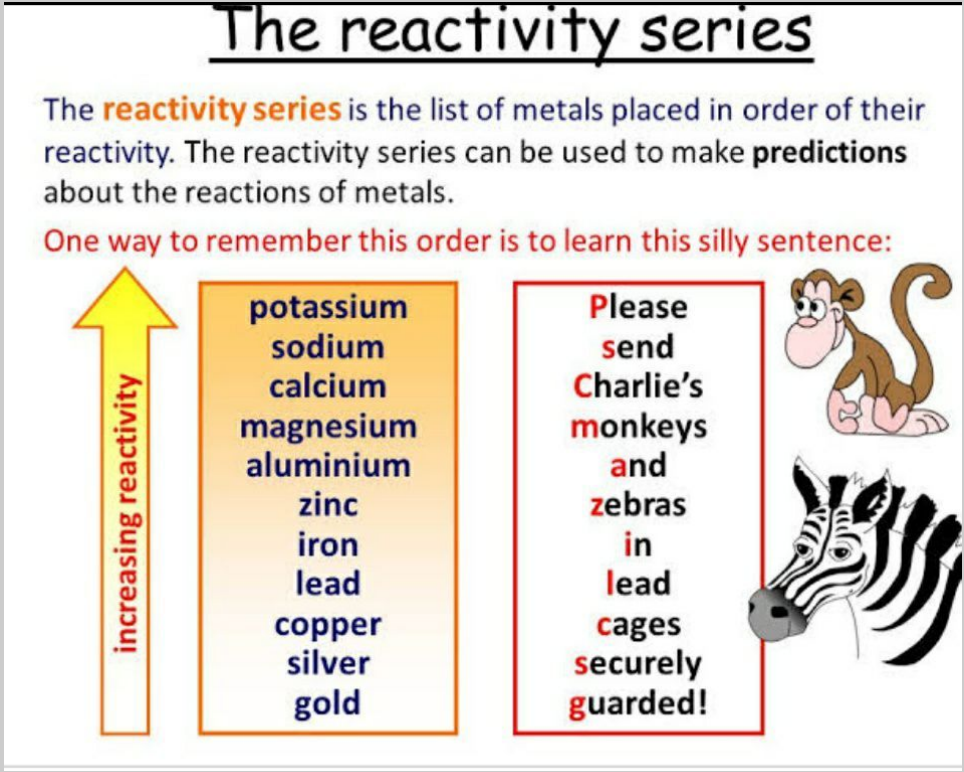
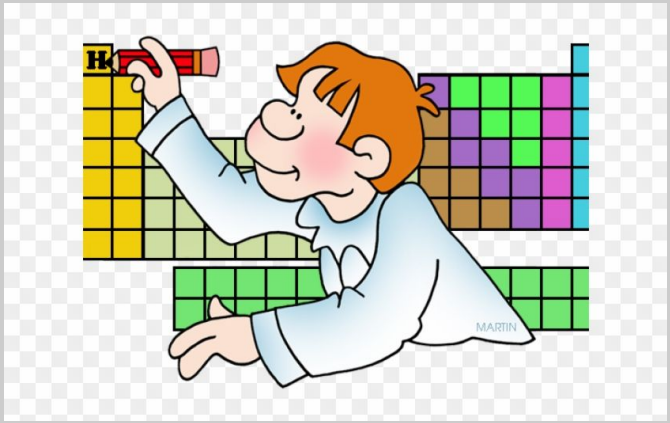
Highly Reactive	Moderately Reactive	Less Reactive
Ca, Mg, Na, K	Zn, Fe	Cu



Check when online

How much do we know our Periodic table?

https://www.funbrain.com/games/periodic-table-game



Physical properties of metals & non-metals (LP1)

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Online Tools	Link/ Activity	Description
website	https://elearning.cpp.edu/learning-objects/periodic-table/	Use the link to revise understanding on periodic table, position of metals, non- metals.
Physical classroom	https://www.physicsclassroom.com/Concept-Builders/Chemistry/Metals-and-Nonmetals	Click on Launch concept builder or Questions or notes. Clicking on Launch concept builder will take them to an exploration through fun quiz
Youtube link	https://www.youtube.com/watch?v=Oh0nv3ErjqU	Use youtube link to explain the properties of metals
	https://javalab.org/en/activity_series_of_metals_en/ http://amrita.olabs.edu.in/?sub=73&brch=3&sim=59&cnt=4 https://www.youtube.com/watch?v=ZXhjNdKtnZ0	Use the simulations on javalab and Olabs followed by youtube link to elaborate on the reactivity of metals, and reactivity series.

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Explore the properties of metals / non metals

https://www.youtube.com/watch?v=AJbe5THaNuU

https://www.youtube.com/watch?v=PHu8hQBtPcY

https://javalab.org/en/ductile_and_malleable_properties_of_pure_metal_en/

https://www.youtube.com/watch?v=wgwJE_5m460

Explore when Online

Concentration of Ores

Separation based on Gravitation

a) **Wilfley table method**

https://www.youtube.com/watch?v=9v4XhNqrxxo

b) **Hydraulic Washing**

https://www.youtube.com/watch?v=-EPb1_I2R_E

c) **Magnetic Separation:**

https://www.youtube.com/watch?v=2jfAnGA40NE

d) **Froth floatation**

https://www.youtube.com/watch?v=E2Ln8KgrhpA&list=RDCMUCCqGTvGZgWw8mFX5KYTHCkw&start_radio=1&t=28

https://www.youtube.com/watch?v=N6_GUs8EJNo

Online Quizzes

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https://quizizz.com/admin/quiz/5c788269e6e24c001acec205/extraction-of-metals

http://www.docbrown.info/page04/Mextract/MextractQmcF.htm

https://www.footprints-science.co.uk/index.php?quiz=The_reactivity_series

https://www.thoughtco.com/metal-properties-quiz-4060806