

metal + Nonmetal + Alloys (मिश्रण एतद्)



SAFALTA CLASSTM

An Initiative by **अमरउजाला**

Metal & Alloy

DIFFERENCE BETWEEN METALS AND NONMETALS



1 H Hydrogen											2 He Helium						
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon
11 Na Sodium	12 Mg Magnesium											13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar Argon
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon
55 Cs Cesium	56 Ba Barium	57 La Lanthanum	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon
87 Fr Francium	88 Ra Radium	89 Ac Actinium	104 Rf Rutherfordium	105 Db Dubnium	106 Sg Seaborgium	107 Bh Bohrium	108 Hs Hassium	109 Mt Meitnerium	110	111	112	113	114	115	116	117	118

 Metals

 Non-metals

118

92



→
→

58 Ce Cerium	59 Pr Praseodymium	60 Nd Neodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu Lutetium
90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium

METALS (धातु) 92

- **Majority elements in the periodic table are metals.** This includes alkali metals, transition metals, lanthanides, actinides and alkaline earth metals.

- आवर्त सारणी में अधिकांश तत्व धातु हैं। इसमें क्षार धातु, संक्रमण धातु, लैंथेनाइड, एक्टिनाइड और क्षारीय-मृत्वी धातु शामिल हैं।

Properties of Metals (Physical शैलिक)

- Shiny (lustrous) in nature चमकदार
- Metal is a good conductor of electricity and heat सुरुवात
- Density and melting point is high ⇒ पारा (mercury)
घनत्व
- Mouldable (Malleable)
- Ductile
- At room temperature, it is in solid form except for mercury
- Opaque //

Chemical Properties of Metals

- Easily corrodible ✓ क्षीय ✓ $4e^-$
- ✓ Can lose electrons
- ✓ Form basic oxides
- Have *low electronegativities*
- Good *reducing agents*

Non metals (अधातु)


$$118 - 92 = \underline{26}$$

In the periodic table, non-metals are located left of the halogens and to the right of the metalloids. *Since noble gases and halogens are also non-metals, these elements are often referred to as non-metals.*

आवर्त सारणी में, गैर-धातुएं हैलोजेन के बाईं ओर और धातु के दाईं ओर स्थित होती हैं।

चूँकि गैसों और हैलोजन भी अधातु होती हैं, इसलिए इन तत्वों को अक्सर अधातु कहा जाता है।

Physical Properties of Non-metals

- Poor conductors of electricity and heat
ଦୁର୍ବଳ
- Non-Ductile metals
- Brittle solids
- Maybe solids, liquids or gases at room temperature
- These are not sonorous
- Transparent 

Chemical Properties of Non-metals

- The number of electrons in the outer shell is generally 4-8



- Easily gain or lose valence electrons

- Form acidic oxides whenever they come in contact with oxygen

- High electronegative elements

- *Great oxidizing agents*

⇒ ALLOYS
AND
ITS USES

ALLOYS (मिश्रित धातु)

Desire \Rightarrow M.P. B.P. $\frac{Ni + Cr}{+} \Rightarrow$ Nichrome ^{एनएन}

• Alloys are a mixture of two or more metals or a metal and a non metal and can not be separated into their components by any physical method.

• मिश्र धातु दो या दो से अधिक धातुओं या एक धातु और एक अधातु का मिश्रण है और इन्हें किसी भी भौतिक विधि द्वारा अपने घटकों में अलग नहीं किया जा सकता है।

\Rightarrow Alloy \Rightarrow metal + Non-metal
 \Rightarrow metal + metal . . .

e.g.:- Brass (पीतल) \Rightarrow Copper + Zinc

H₂S Gas ^{M.P.}

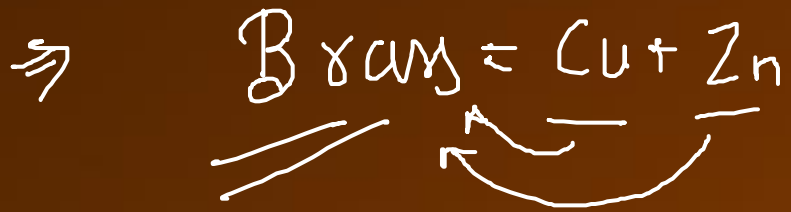
- Alloy is a homogeneous mixture that is solid to solid solution.
- मिश्र धातु एक सजातीय मिश्रण है।

ढौस + ढौस → दिलयन

Cu + Zn → Brass
पीतल }

- Ferrous Alloy/steel alloy contains Fe and non-ferrous Alloy contains Cu.

- It shows the property of its constituents and can have variable composition.
- यह अपने घटकों की गुण दिखाता है और इसमें परिवर्तनशील संरचना हो सकती है।



- The electrical conductivity is less than and melting point of an alloy is more than that of pure metals. ✓✓
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• AMALGAM (अमलगम) (पारा मिश्रधातु)
पारा

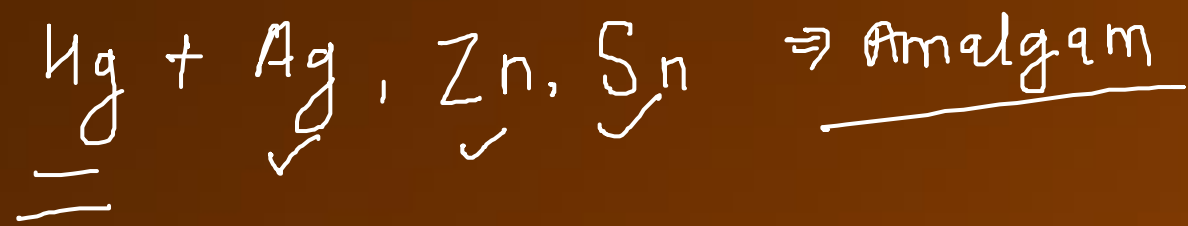
• An AMALGAM is an alloy of mercury with another metal, It may be a liquid or solid, depending upon the proportion of mercury.

पारा
mercury + धातु
metal \Rightarrow अमलगम

Hg
80 + Any metal \Rightarrow Amalgam

- Mercury + Silver, Zinc, & Tin used in tooth filling.

१०
धारा +



ALLOY OF GOLD (सोने की मिश्रधातु)

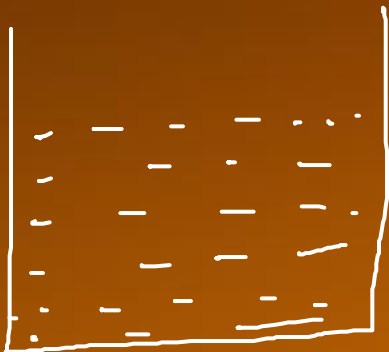
- Pure Gold (24 Carat) is very soft.

↓
मौला

24 carat → Jewellery के लिए

Suitable नहीं है!

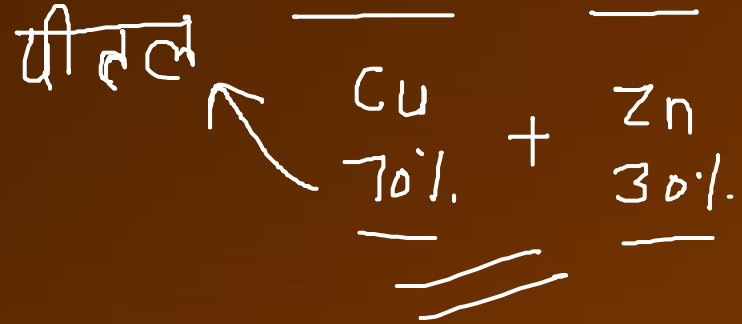
⇒ 22 carat + 2 carat (Ag, Cu)



Aqua Regia

IMPORTANT ALLOYS & THEIR USES

- 1. BRASS : Copper + Zinc



- Uses : Bell, Utensils.

Yellow

- 2. BRONZE : Copper + Tin

कांस्य →

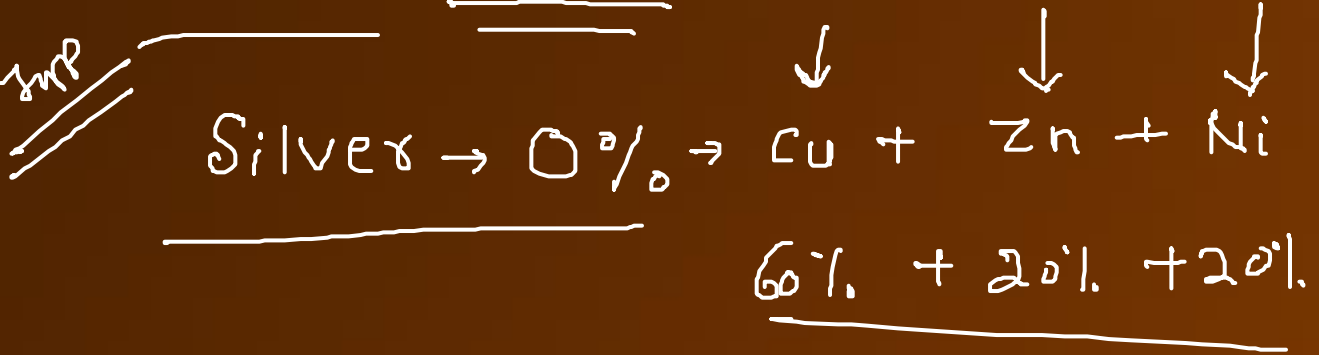


90% + 10%

- Uses : Coins, Bell, Utensils.

उत्सु

- 3. GERMAN SILVER : Copper + Zinc + Nickel



- Uses : Utensils, Jewelry, Handle.

- 4. ROLLED GOLD OR ARTIFICIAL GOLD : Copper + Aluminum

कृत्रिम सोना

Cu + Al

90% + 10%

- Uses : Cheap ornaments.

सस्ते सामूह्यता

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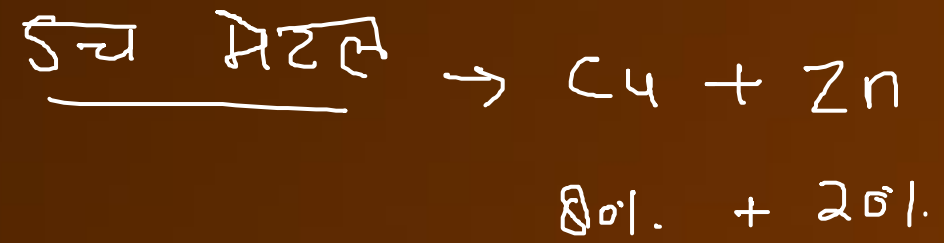
- 5. GUN METAL : Copper + Tin + Zinc + Lead

Ans



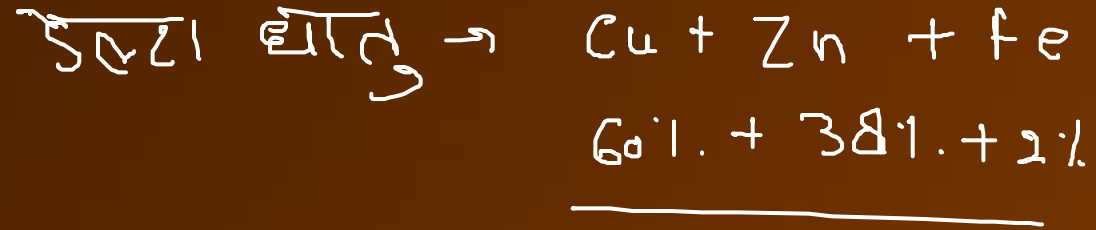
- Uses : Guns, Barrels, Gears & Bearings.

- 6. DUTCH METAL : Copper + Zinc



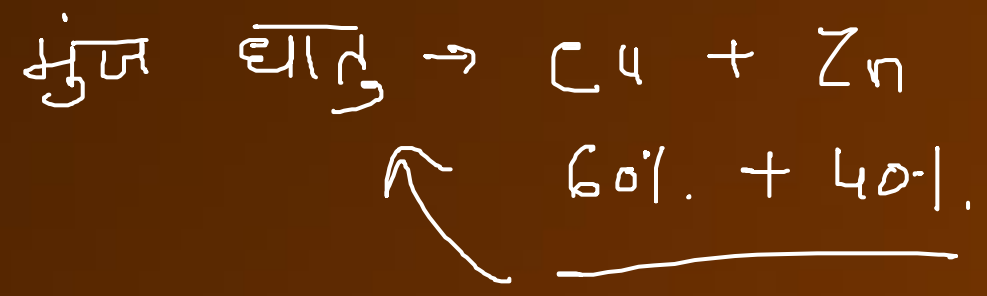
- Uses : Artificial ornaments.

- 7. DELTA METAL : Copper + Zinc + Iron



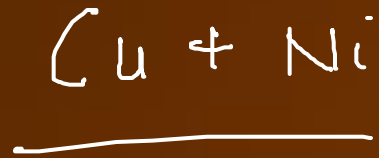
- Uses : Blades of Planes. ✓✓

- 8. MUNZ METAL : Copper + Zinc



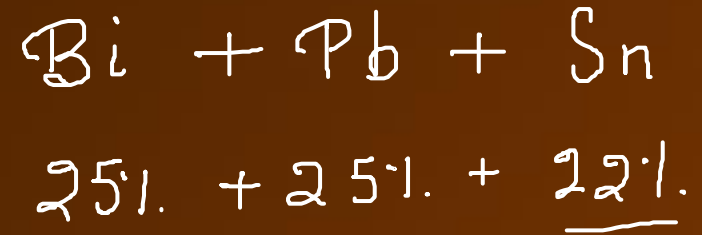
- Uses : Making coins.

- 9. MOLEN METAL : Copper + Nickel



- Uses : Making Valves, Pumps, Shafts, ~~Heat~~ Heat exchangers, Resistant to corrosion & Acids.

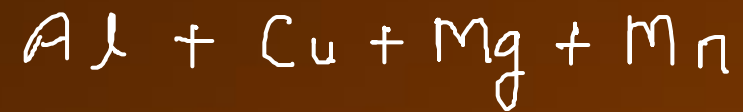
- 10. ROSE METAL : Bismuth + lead + Tin



- Uses : Automatic Fuse and Solder.

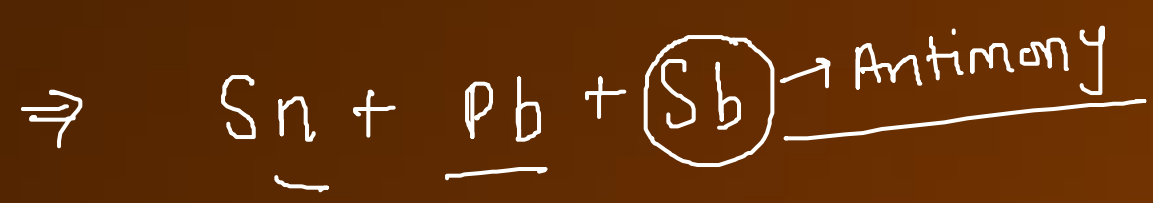
- 11. DURALUMIN : Aluminum + Copper + Magnesium and Manganese

दुमुरैल्युमिन



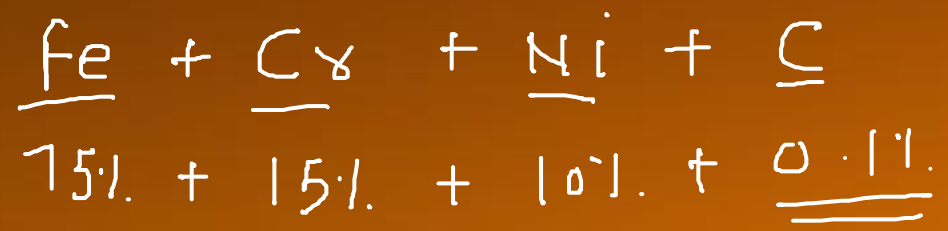
- Parts of Cars & Planes, Utensils.

* Type metal (टाइप धातु)



⇒ Printing industry.

* Stainless Steel :- Steel → Ox.



uses: नर्सिंग,
Surgical cutlery.

* Eureka (Constantan)

⇒ Cu + Ni
60% + 40%

⇒ Use: wire

* Nickel Steel: Ni + Fe + C

Use:- Automobile industry.

Nichrome:-

1. High
Ni + Cr + Mn + Fe

⇒ High Oxides

* Alnico :-

Al \rightarrow 8-12%.

Ni \rightarrow 15-25%.

Co \rightarrow 5-24%.

Fe

Ti

uses: Artificial magnets.

* Sterling Silver

Silver + Copper

Ag + Cu

Uses: Jewellery

* Steel:- Iron + Carbon
Fe + C

use: ships, bridge

* Wood's metal:- Bi + Pb + Sn + Cd
50g. + 25g. + 12.5g. + 12.5g.

use:- fuse plugs, Automatic sprinkles.

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