

Carbon

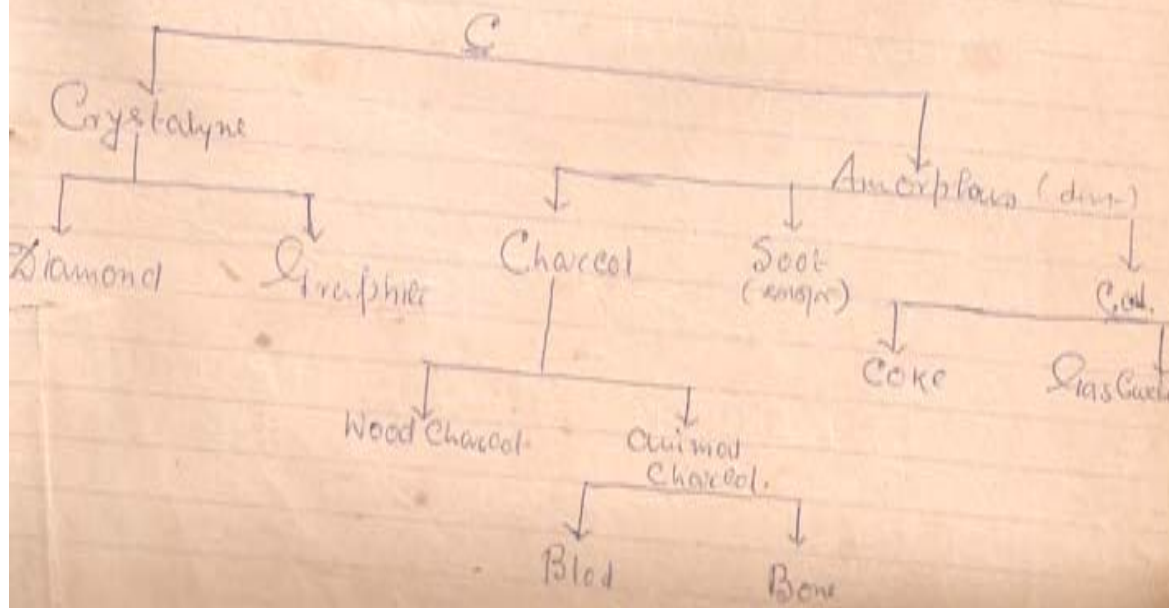


What do you mean by allotropy? What are the allotrops of Carbon. Prove that the allotrop of Carbon contains only Carbon. How is CO prepared in the lab in fairly pure form. Discuss its reaction with
 (1) Water, (2) Fe_2O_3 (3) Cl_2 (4) Fe giving Conditions. (5) N_2

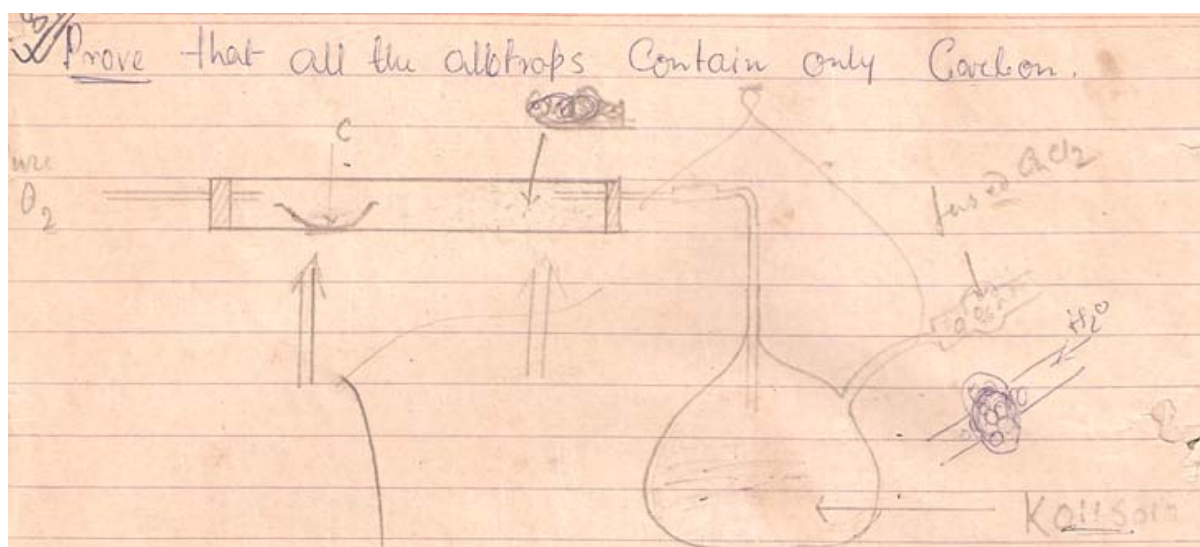
Convert CO into CO_2 and vice versa. Prove that CO contains Carbon. Why CO_2 is not prepared by using H_2SO_4 during lab. preparation. Draw a sketch of Kipp's apparatus explaining its function. How the following gases are prepared in Kipp's apparatus
 (1) CO_2 (2) H_2 (3) SO_2 (4) Cl_2 (5) O_2 (6) H_2S

ANS

There are some elements which exist in nature having the different physical properties but their chemical properties are almost the same.
 AS for exam: Red P and White P.
 In Sulphur - α , β , γ , δ Sulphur are the allotrops of Sulphur.



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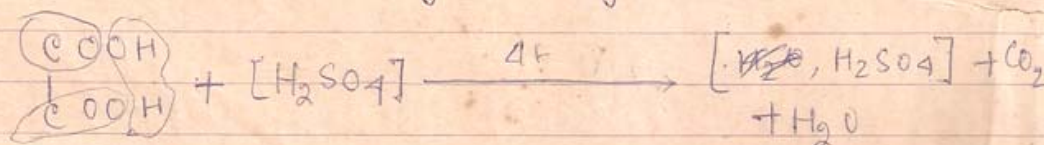


Let us take 1 gm of any allotrop of Carbon (say coal) in a porcelain boat in a long glass tube as shown in the figure. On heating the tube and passing pure dry O_2 over heated Carbon we get CO_2 . This gas is absorbed in a potash bulb (KOH bulb) whose weight is known previously. The increased weight of Potash bulb is noted which is 3.666 gm.

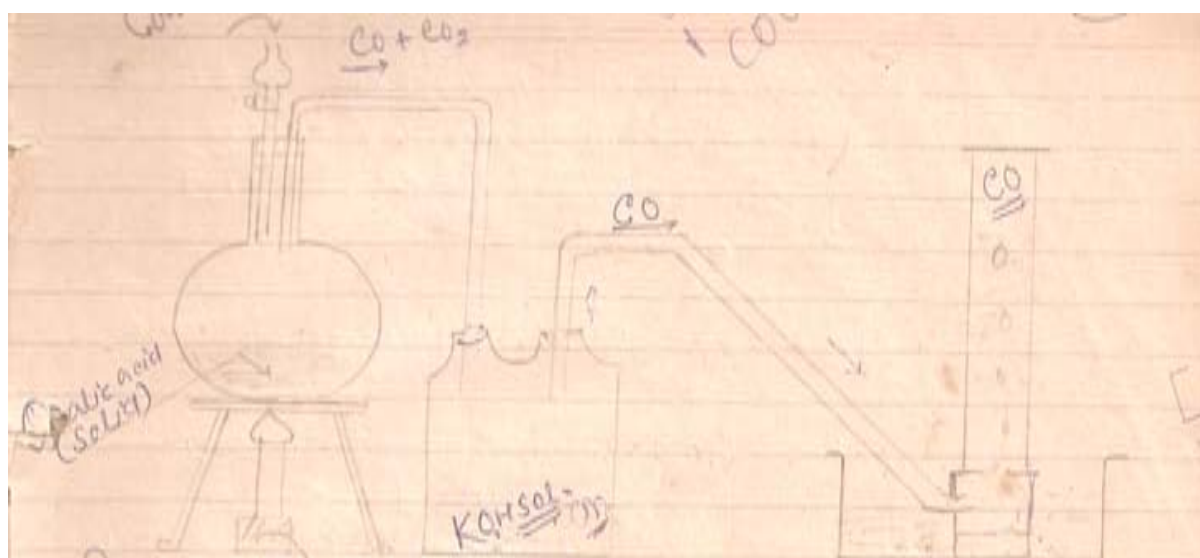
Taking other kind of Carbon allotrop the above experiment is repeated in which the increased weight is 3.666 gm by this way taking the other allotrop we get the same constant value. So it is proved.

Preparation of CO

Theory: When a mixture of Oxalic acid and con. H_2SO_4 is heated we get CO gas.



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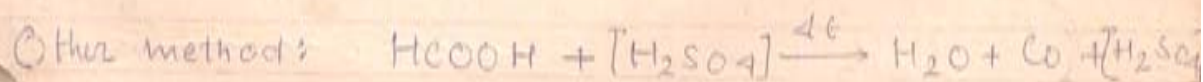


In a round bottom flask about 40 gms of Oxalic acid is taken. It is fitted with a dropping funnel and delivery tube leading to a woolsbottle containing KOH soln as shown in the diagram. Through the dropping funnel about 25 cc of conc. H_2SO_4 is added into it. The mixture is heated gently to get both CO_2 and CO .

The gas mixture is passed through KOH to remove CO_2 and the left gas is collected by downward displacement of water.

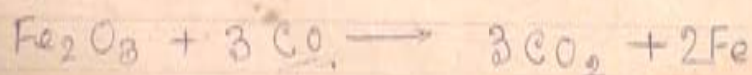
Precaution: 1. Heating should be gentle.

Purification: The gas is ~~passed~~ ^{passed} through KOH soln then dried by solid P_2O_5 and then collected by displacement of mercury.



Properties: It is a colourless gas, slightly soluble in water, as heavy as air, it is highly poisonous.

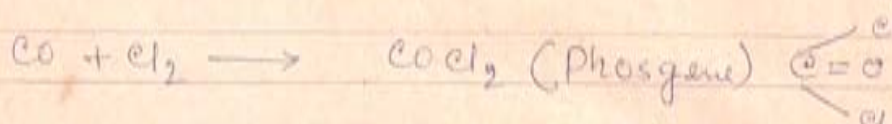
CO] Chemical: 1. Fe_2O_3 : When Fe_2O_3 is heated with CO we get metallic iron. (blast furnace)



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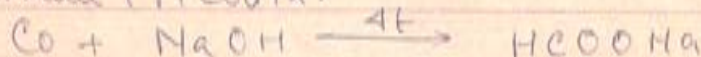


2. With Cl_2 : When a mixture of CO and Cl_2 is kept in sunlight it forms carbonyl chloride / Phosgene which is extremely poisonous and used in 1st World war by ~~German~~ German.

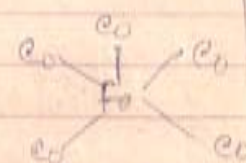
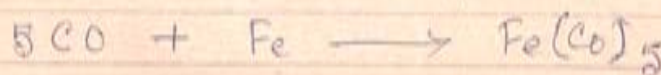


W.H.

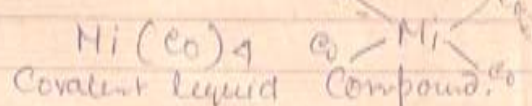
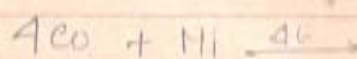
3. With NaOH \rightarrow When CO gas is passed through NaOH solid under pressure at 160°C or CO is passed over heated solid NaOH we get an organic compound that is sodium formate (HCOONa).



4. (a) With Fe \rightarrow When CO gas is passed over heated Iron we get Iron Carbonyl

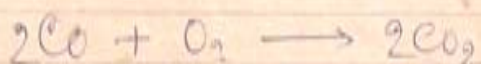


(b) With Ni \rightarrow When CO gas is passed over heated Nickel we get Nickel Carbonyl



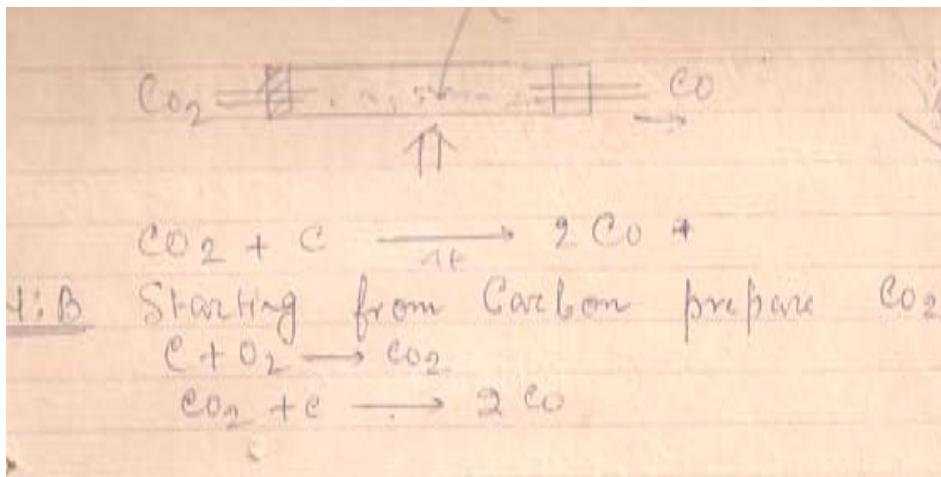
Convert CO into CO_2

2. CO is on burning with oxygen gives CO_2

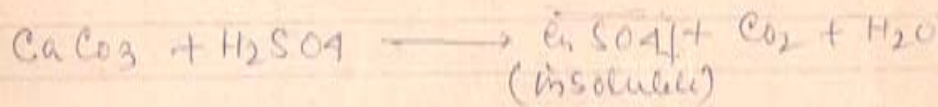


When CO_2 is passed through heated carbon takes in a long tube it is changed into CO

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H_2SO_4 and CaCO_3 gives CO_2 no doubt but due to the formation of insoluble CaSO_4 coating over the limestone the further reaction is stopped. So preferably dilute HCl is used where CaCl_2 is soluble.

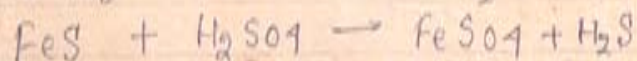
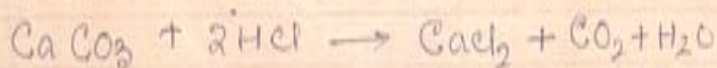


Kipp's Apparatus:

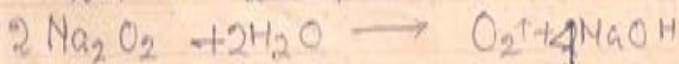
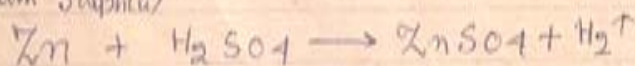
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Conditions: for Kipp's Apparatus: (1) One of the reactant is solid and the other should be liquid.

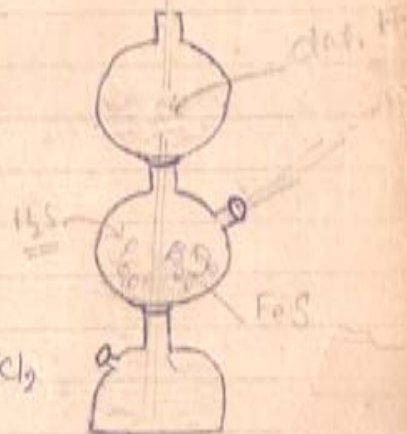
(2) Gas should evolve without heating.

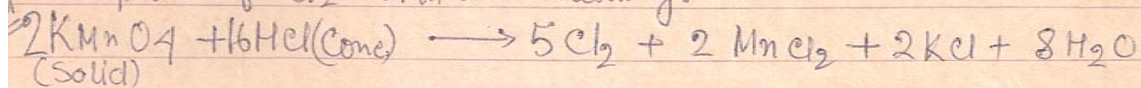
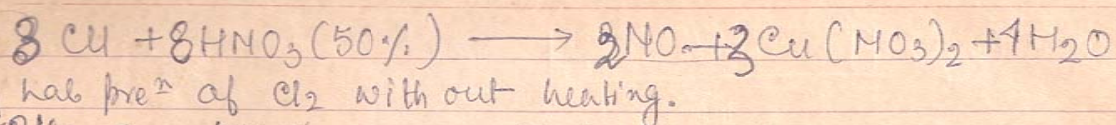


(Calcium sulphite)



(Sodium peroxide)





partial reaction

