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Introduction

An alloy is a homogeneous mixture of two or more metals or a metal and non-metal.

They are generally harder than their components with reduced malleability and ductility. Alloys are prepared to enhance certain characteristics of the constituent metals, as per requirement. In this project, we shall qualitatively analyze the chemical composition of two alloys:

Brass and BronzeAim of the Experiment

General objective:

This project is being carried out with a view to increase the appreciation of alloy-analysis as an important branch of chemistry. The hands-on laboratory experience gained is highly beneficial in understanding the general procedure of qualitative analysis of an unknown sample.

Specific objective:

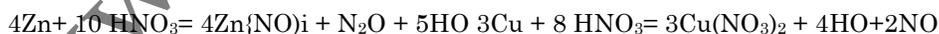
In this project, we shall be analyzing the constituents of Brass and Bronze.

MATERIALS REQUIRED

1. BRASS AND BRONZE PIECES
2. china dishes
3. FILTRATION APPARATUS
4. NITRIC ACID
5. HYDROGEN SULPHIDE GAS
6. AMMONIUM CHLORIDE
7. POTASSIUM FERROCYANIIDE
8. AMMONIUM SULPHIDE
9. DIL HYDROCHLORIC ACID

TheoryBrass

Brass contains Cu and Zn . Both dissolve in nitric acid.



Further analysis is carried out for respective ions.

Cu dissolves in H₂S to give black ppt. of CuS. It is filtered to get the soln of Zinc Sulphide. It precipitates out in the form of ZnCl₂ in an ammoniacal soln. of Ammonium chloride. The precipitate is dissolved in dilute HCl and then treated with Potassium ferrocyanide to get a bluish-white ppt. of Zn₂[Fe(CN)₆].

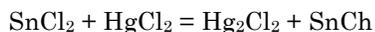
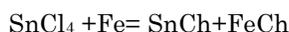
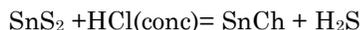
Bronze

Bronze contains Cu and Sn. Their nitrates are obtained by dissolving the sample in conc. Nitric acid. The nitrates are precipitated as sulphides by passing H₂S through their solution in dil. HCl.

The CuS is insoluble in yellow ammonium sulphide, while SnS is soluble. The ppt. is separated by filtration.

The ppt. is dissolved in cone HNO_3 and then Ammonium hydroxide solution is passed through it. Blue colouration confirms the presence of Cu.

The filtrate is treated with conc. HCl followed by Zinc dust to obtain SnCl_2 . Then HgCl_2 solution is added. Formation of slate-coloured ppt. indicates the presence of Sn.



Detail of Procedure/Observations Brass,

1. A small piece of brass was placed in a china dish and dissolved in minimum quantity of 50% conc. HNO_3 .
2. The soln. was heated to obtain a dry residue. The residue was dissolved in Dilute HCl . H_2S gas was passed and a black ppt. was observed. The soln. was filtered and the ppt. was dissolved in NH_4OH soln.
3. A blue coloration observed indicates the presence of Cu.
4. The filtrate was tested for presence of Zn.

Ammonium hydroxide and chloride solutions were added and then H_2S gas was passed. A dull grey ppt. was separated and dissolved in dil. HCl followed by addition of Potassium ferrocyanide. A bluish white ppt. confirms the presence of Zn.

Bronze:

1. The sample was dissolved in 50% HNO_3 and then heated to obtain nitrates.
2. The nitrates were dissolved in dil. HCl and then precipitated as sulphides by passing H_2S

gas.

1. The precipitates were treated with yellow amm. sulphide when a part of it dissolves. The soln. was filtered.
2. The ppt. was tested for Cu as in the case of

brass.

1. The filtrate was treated with conc.
2. HCl followed
3. by Fe dust.

6. Then HgCl_2 soln. was added. Formation of a slate-coloured ppt. confirmed the presence of Sn.

Conclusion

Brass contains Copper and Bronze contains Copper and Tin.

Bibliography

Comprehensive practical Chemistry- Class 12.

Inorganic Chemistry by

www.thechemistryguru.com

Signatures: