Time schedule – changed version

Practice 8 *(2013. Apr. 3.)*. The chemistry will be discussed on the 8th seminar *(2013. March. 27.)*

1. The reactions of cations
2. The analysis of cation group I and group IIA (Copper(II), silver(I), cadmium(II), mercury(I), mercury(II), lead(II) and bismuth(III) ions).

Purity test

3. Investigation of lead impurity in boric acid.

Practice 9 (*2013. Apr. 10.)*. The chemistry will be discussed on the 9th seminar *(2013. Apr. 8.)*

1. Sanger – Black's test for trace analysis of arsenic impurity in solution ***(demonstration).***
2. The reactions of cations of cation group I and group IIA (Copper(II), silver(I), cadmium(II), mercury(I), mercury(II), lead(II) and bismuth(III) ions) with KI and $K_2Cr_2O_7$ ***(demonstration).***

Purity test

3. Investigation of silver impurity in "bismuth subnitrate, heavy".

Unknown sample

4. Detection of two cations of group I or IIA in a solution (Ag^+, Cd^{2+}, Cu^{2+}, Hg_2^{2+}, Hg^{2+}, Pb^{2+}, Bi(III) (Hg_2^{2+} – Hg^{2+} and Cu^{2+} – Hg_2^{2+} ions are not given together).

Voluntary test

– Detection of one or two cations of group I and IIA in solution (Hg_2^{2+} – Hg^{2+} and Cu^{2+} – Hg_2^{2+} ions are not given together).

Practice 10 *(2013. Apr. 17.)*. The chemistry will be discussed on the 10th seminar *(2013. Apr. 15.)*

1. The analysis of cation group IIB (arsenic(III), arsenic(V), antimony(III), antimony(V), tin(II) and tin(IV)).
2. Reactions of permanganate, chromate and dichromate ions ***(S.I. Practice 11).***
3. Preparation and properties cyanide complexes of some transition metal ions ***(S.I. Practice 11).***
4. Oxydation states of transition metals belonging to 3d row in aqueous solutions ***(S.I. Practice 11).***
5. Use of organic reactions in analysis ***(S.I. Practice 11).***

Purity test

6. Investigation of iron impurity in citric acid.

Practice 11 *(2013. April 24.)*. The chemistry will be discussed on the 11th seminar *(2013. April 22.)*.

1. The analysis of cation group III (nickel(II), cobalt(II), iron(II), iron(III), manganese(II), chromium(III), zinc(II) and aluminium(III) ions).
2. "Fluoride test" for aluminium ***(demonstration).***
3. Detection of traces of nickel in cobalt salts.

Unknown sample

4. Detection of two cations of group III in solution (the oxidation state of Fe and Cr can be +3, and the oxidation state of Mn can be +2 only).

Voluntary test

– Detection of one or two cations of group III in solution (the oxidation state of Fe and Cr can be +3, and the oxidation state of Mn can be +2 only).

No practice will be held on the 1st May.

Practice 12 ***(2013. May 8.)*****. The chemistry will be discussed on the 12th seminar** ***(2013. May 6.)***

1. The analysis of cation group IV (calcium(II), strontium(II) and barium(II) ions).
2. The analysis of cation group V (magnesium(II), lithium(I), sodium(I), potassium(I) and ammonium ions).
3. Reaction of Sr^{2+} and Ba^{2+} ions with sodium rhodizonate ***(S.I. Practice 13).***
4. Salts of alkali metal ions with poor solubility in water ***(S.I. Practice 13).***
5. Detection of traces of ammonia ***(demonstration).***

Unknown sample

6. Detection of two cations of group I, IIA, III, IV or V in solution (**One** component is a cation of group I, IIA or III (Cu^{2+} ; Ag^{+} ; Cd^{2+} ; Hg_2^{2+} ; Hg^{2+} ; Pb^{2+} ; Bi(III) ; Ni^{2+} ; Co^{2+} ; Fe^{2+} ; Fe^{3+} ; Mn^{2+} ; Cr^{3+} ; Zn^{2+} ; Al^{3+}) and the **other one** is a cation of group IV or V (Ca^{2+} ; Sr^{2+} ; Ba^{2+} ; Li^{+} ; Na^{+} ; K^{+} ; NH_4^{+}). The oxidation state of Cr is +3, and the oxidation state of Mn is +2. Fe can be in oxidation state +2 or +3).

Voluntary test

– The same as the unknown sample (solution is given).

Demonstrations taken from the lectures

*7. Preparation and colour of chromium(VI) peroxide ($CrO(O_2)_2$) (**V**.III.24.8.b.).*

Practice 13 ***(2013. May 15.)*****. The chemistry will be discussed on the 13th seminar** ***(2013. May 13.)***

1. The analysis of anion group IV (nitrite, nitrate and chlorate ions).
2. Detection of nitrite and nitrate ions with Griess-Ilosvay reagent.

Unknown sample

3. Detection of two anions of group I–IV in a mixture of two alkali metal salts (CO_3^{2-} S^{2-} ; SO_3^{2-} ; SO_4^{2-} ; PO_4^{3-} (HPO_4^{2-} ; $H_2PO_4^{-}$); F^{-} ; BrO_3^{-} ; IO_3^{-} ; Cl^{-} ; Br^{-} ; I^{-} ; NO_2^{-} and NO_3^{-}). The pairs of : SO_3^{2-} – SO_4^{2-} ; Br^{-} – NO_3^{-} and I^{-} – NO_3^{-} are not given).

Voluntary test

4. The same as unknown sample, but solution is given.

Demonstrations taken from the lectures

5. Preparation of nitrous acid (cc. NO_2^{-} solution + ice + HCl) (GEL 4.26).
6. The brown ring test for nitrit ions (GEL 4.29c).
7. The Gries-Ilosvay reaction for the nitrite ions (GEL 4.31).
8. Reaction of chlorate ions with cc. H_2SO_4 (GEL 4.31).

Practice 14 ***(2013. May 22.)*****. The chemistry will be discussed on the 14th seminar** ***(the date to be discussed later)***

1. Summary on group reactions.
2. Complete qualitative analysis of a solid sample.

Unknown sample

3. Complete qualitative analysis (cations, anions) of a solid mixture of two components. The cations or the anions in the two components are the same. This way **the number of the detectable ions is 3.**
The same **cations** can be in the sample which were investigated formerly (Cu^{2+} ; Ag^{+} ; Cd^{2+} ; Hg^{2+} ; Pb^{2+} ; Bi(III) ; Ni^{2+} ; Co^{2+} ; Fe^{3+} ; Mn^{2+} ; Cr^{3+} ; Zn^{2+} ; Al^{3+} ; Ca^{2+} ; Sr^{2+} ; Ba^{2+} ; Li^{+} ; Na^{+} ; K^{+} ; NH_4^{+}), but Mg^{2+} is not given, and also two cations of group IV and of group V can not be together. The oxidation state of Hg, and Mn can be +2 only, oxidation state of Fe and Cr can be +3.
The possible **anions** are as follows : CO_3^{2-} (HCO_3^{-}) ; SO_4^{2-} ; PO_4^{3-} (HPO_4^{2-} , $H_2PO_4^{-}$); F^{-} ; Cl^{-} ; Br^{-} ; I^{-} ; NO_3^{-} The various protonated forms of the anions cannot be identified.

4. Inventory and return of laboratory equipments.