2ND WORKSHOP ON APPLIED AND SUSTAINABLE ENGINEERING

PURE A GOLD

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The deposition of gold coatings on the welded stained glass caused large problems with the darkening of the gold coatings at the first stage. Gold coatings darkened during deposition of gold not in the bath but during electrolysis that worked at 10-12 Ah.
The parallel studies of indium and gallium, which are the subject of research, let us assume by analogy that the thallium in the same subsystem of the periodic system will have the same or similar inhibiting features in the process of formation of cyanide complexes.
Indium and gal introduced into the bath to settle in electrothermal conditions coincided with gold which thallium did not do. Consequently, thallium was selected as a stabilizer for the gold process in both "Aurobond V" and "Pure - a - gold".
Stabilization of the gold plating process consists of preventing the formation of polymer / H: N / n, which deposits together with gold and causes darkening of coatings.
Dark gold coatings also have a higher porosity and, therefore, worse thermal resistance.
Thallium acetate and its compounds commercially available as reagents are contaminated by lead which negatively affects the quality of the coating.
Therefore, it is necessary to prepare such a compound of thallium, which is soluble in liquids, and most importantly, this compound of monovalent flux does not pollute the bath with its accompanying lead.
Talad acetate preparation was developed, which became the basic ingredient of all three "Make up", "PA" and "PP" stabilizers.
In addition, the "PP" stabilizer is designed to stabilize the gold-plating process in the "Aurobond" capillaries. It contains potassium oxalate which precipitates such metals as Fe, Co, Ni and others.
Potassium oxalate does not, however, completely deplete ionic ions. Hence, attention is drawn to the exact synthesis of tall metal acetate from the metallic thallium and the complete purification of the preparation from the lead compounds during synthesis.

SYNTHESIS OF OVAL PROTECTION WITHOUT OXIDE CONTAMINATION
Obtaining tall sulfate

reagents

Nitric acid / HNO3 /

Sulfuric acid / H2SO4 /

hydrogen chloride / HCl /

Metallic Talc is dissolved in hot dilute nitric acid (HNO3 /

It gets heated with a small excess of concentrated sulfuric acid / H2SO4 / until acidic smoke emanates, excess water is added and the sedimented sulphate precipitates. The small amount of titanium salt produced is reduced with SO2. In the solution of tall sulfate tall chloride is precipitated by hydrochloric acid (HCL) / which dissolves in hot diluted sulfuric acid.The solution settles to the beginning of crystallization. The talc sulphate is dissolved in aqueous solution with sulfuric acid at pH 2-1. Electrolysis is carried out using a current of 0.1 Ah at 4V. Electrodes are short platinum wires fi 1mm contracting with a solution only on the length of 1cm. An anode melt in a glass tube is carried through the solution so that the short free end of the platinum wire is at the bottom of the vessel. The cathode is immersed in the solution just below the surface. This separated thallium is removed from the catfish with the help of narrow glass forks. After washing with water, pure thallium dissolves in sulfuric acid (H 2 SO 4) and the solution settles to the beginning of crystallization. Crystals are distilled from hot water and dried at 170 degrees Celsius.

2) GETTING THE TALL VEGETARIAN

reagents:

- Sulfate salts
- carbon bar
- active carbon
- ethanol

Density: 7.11

Melting point of 273 degrees Celsius

Insoluble in ethanol, ether and acetone.
4.03 g of this salt dissolves in 100ml of water at 15.5 degrees Celsius 27.2 grams at 100 degrees Celsius.
50 grams of talc sulphate and 24 grams of barley are boiled in 500 ml of water for several hours, and the sample of dregs contains no sulphate.We dress and we settle the boil several times with water. This compound, soluble in boiling water, is colorless while boiling with activated carbon, we dress and cut off adding ethyl alcohol.The washed crystals wash cold water and ethyl alcohol. Then we dry.

3) Thallinum acetate

Reagents
- Caravans
- Acetic acid

Colorless crystals

Density - 3,68

Melting temp - 110 degrees Celsius

Well- soluble in water
47 grams of talc is dissolved hot with 50 - 60 ml of 30 percent acetic acid
so that the solution was acidic. We use this solution and we intensify the crystallization.
We set off for the day in a refrigerator and extract the separated crystals.

Analysis:
Salt in aqueous solutions can be identified similarly to silver salts.
They are precipitated with excess 0.1 N sodium chloride, filtered off and washed with talc chloride.
We titrate excess sodium chloride with 0.1 N sodium nitrate to silver in the presence of potassium chromate.

PREPARING STABILIZERS
Make Up Stabilizer
Dissolve 3.225 grams of talc / Tl / CH3COO // in 1dm3 of distilled water. Add 1.5 grams of potassium cyanide to prevent hydrolysis of dissolved talc salt.
Type "PA" stabilizer
Dissolve 308 grams of oxalic acid cz.cz. in 1dm3 of distilled water. Neutralize oxalic acid with 2N potassium hydroxide to pH 6.
Add 0,645g of specially formulated talc and make up to 4 dm3.
Type "PP" stabilizer
Dissolve specially prepared amount of 0.3225 g of talium acetate in 1dm3 of water, add 0.5 grams of potassium cyanide to prevent hydrolysis of soluble salts of talade.

COMMENTS
1 Weigh thallium
2 Dissolve in hot HNO3 / 1: 1 /.
3 Pour 30ml of H2SO4.
4 Add distilled water in excess
5 Sew - the precipitate is thrown away/ if the precipitate does not occur- we do not suck.
/salt reduction with SO2 - do not carry out/.
6 Pour HCl to settle the sludge / pour slowly, long enough to let the sludge stop precipitating /
7 Dress – pour the solution after the process
8 Dissolve the sludge in H2SO4 / 1: 1 /
/ If it resists dissolving, heat it, add H2SO4, then add water until it gets dissolved /
9 We go - to evaporate as much H2SO4 as possible, because then hydrogen instead of thallium is electrificated on the cathode. White powder is formed.
10 This powder is dissolved in distilled water (try not to add H2SO4), the solution is heated / if talonate sulphate is crystallized - add water /.
11 We measure the pH of the solution
12 We are going to the electorate
Take off the thallium settled on the electorate into the same pot with a baguette.
13 Wash the separated metal with distilled water and weigh to find out about the amount.
14 Pour a small amount of distilled water and heat
15 Pour some sulfuric acid / 1ml /
/ it is advised to prepare H2SO4 with a concentration of 1: 1 and to supplement the dissolution of the thallium/.
16 The solution is set and set aside for the next day to crystallize / if it evaporates to dry, water must be diluted and put in the refrigerator, crystals in the shape of needles /
17 Sew crystallized sulfate
18 Insert into the drier (keep the temperature moderate) in order to dry the crystals
19 Dissolve about 2g of thallium in water / crystallized sulfur /
Warm it up.
20 Add about 3g of BaCO3/ excess BaCO3 is fine, add distilled water while heating. At first, the solution looks like milk soup, then the white BaSO4 is noticeable.
21. Check that Tl2SO4 is still there. We dissolve the barium acetate in distilled water and add a few drops of solution, if the residue has been lost, it is still necessary to cook.
Barium acetate + thallium sulphate = gives an insoluble barium sulphate precipitate
22. We weave the solution after evaporation to evaporate to dry, and the precipitate is evaporated / evaporated to dryness, a little is left to cool and put into the refrigerator to crystallize better. Crystals in a form of needles.
23 Pour some distilled water and heat to dissolve the crystals.
24 Add active carbon and cook. Pour some water at a time.
25 Start weaving /while warm / - throw away the sludge.
26 Add ethyl alcohol to the solution after dilution / It is best to evaporate some solution at the beginning. Then pour ethyl alcohol. We add enough alcohol to make the carbonate talc lose - white powder.
27 Percolate
28 Put the sludge with the drain into the drier

LITERATURE

1. Witraże. Technika Tiffany; Hanka Krejsowa; wyd. RM; 2005 r.

2. Historia sztuki szklarskiej; Wacław Laba; Oficyna Wydawnicza Apla; 2007 r.

3. Witraż. Projektowanie i realizacja; Pere Valldeperez; wyd. Arkady; 2001 r.