

RU5GRAY

RUTHENIUM READY TO USE PLATING BATH 5G/L TITANIUM GREY COLOR

DESCRIPTION

RU5GRAY is a ruthenium plating electrolyte which deposits an abrasion resistant layer of ruthenium metal in a titanium gray color. The gray color produced is that of pure ruthenium as the solution does not contain any additional organic additives for darkening purposes. This lack of additional chemical makes RU5GRAY the fastest depositing ruthenium, functional at lower than optimal temperatures. This acidic based compound is primarily used in decorative plating applications for a diverse color option in the case where corrosion resistance is also a requirement. The plating deposit is durable and can reach a maximum thickness of 0.2 micron. Due to the fact ruthenium has a lower efficiency than other precious metals, the electrolyte requires a greater metal concentration to function optimally.

- Titanium grey color
- 5 grams per liter
- Economical precious metal deposit
- Fastest depositing ruthenium electrolyte
- Functional at lower than optimal temperatures

DEPOSIT DATA

| | |
|------------------------------|-------------|
| Purity (%) | 99.9 |
| Hardness [HV 0.01] | 800 - 900 |
| Density [g/cm ³] | 12.4 |
| Thickness from-to [µm] | 0.02 - 0.20 |
| Aspect | Shiny |
| Color | Gray |

| PRODUCT USAGE | RANGE | OPTIMAL |
|--------------------------------------|-----------|---------|
| Voltage [V] | 1.8 - 2.2 | 2.0 |
| Current density [A/dm ²] | 0.5 - 2.0 | 1.0 |
| Working temperature [°C] | 50 - 70 | 60 |
| Treatment time [min] | 1 - 6 | 4 |
| Cathodic efficiency [mg/Amin] | 1 - 5 | 3 |
| pH | 0.8 - 1.5 | 1.0 |
| Anode/cathode ratio | 1:1 - 4:1 | 2:1 |
| Anode type | Ti/Pt | |
| Stirring | strong | |

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METAL CONCENTRATION

| METAL | RANGE | OPTIMAL |
|-------|-----------|----------|
| Ru | 3.0 - 5.0 | 5 g Ru/l |

COLOR COORDINATES

| | |
|-----|------|
| L * | 72.1 |
| a* | 0.6 |
| b* | 2.9 |
| c* | 2.9 |

Note:

Color coordinates here reported have been measured on a white underlayer and they are to be intended as PURELYINDICATIVE being strongly dependent on underlayer color , on thickness of the deposit and on specific design(shape)of the surface.

RELATED PRODUCTS - MAINTAINING

| | |
|-------------|--|
| RU5R.100ML* | Ruthenium sulfamate 5 g Ru/100ml - 100 ml |
| RU5S.1KG* | Conducting salts for ruthenium plating solution - 1 kg |

* Product which is subject to the international regulations concerning transportation of dangerous goods

USER GUIDE**READY TO USE SOLUTION PREPARATION**

RU5GRAY is a ready-to-use plating solution at the concentration of 5 g/l of ruthenium. No preparation is required. Pour it directly into working tank, heat it up to the preset temperature and once reached start to plate.

ANODES

Use Titanium Platinized anodes with a layer in platinum not lower than 1.5 µm.

WORKING TANK MATERIALS

For small volume amount solutions - in beaker scale - use Pyrex glass; vice versa use PP/PVC/HDPE tanks for larger volumes and equipped with an efficient exhaust fume/suction or aspiration system.

DC POWER - RECTIFIER

Use a current DC rectifier having an alternate current residue –ripple– less than 5% and having an output amperage enough to obtain a proper electroplating process. The rectifier should be equipped with:

- Amperemeter
- Voltmeter
- Ampere/minutes counter (for bigger installations only).

HEATING SYSTEM

The admitted materials for heaters are: Pyrex, quartz or PTFE.

FILTRATION AND MOVEMENT

For bigger plating installations (> 5 liters) it is advisable to keep the plating solution continuously filtered and in movement through a magnetic driven filter pump with 5-15 µm cartridges in PP that must have been previously conditioned by boiling them for at least 3 hours and then washed with DI water in order to prevent any possible organic contamination.

PLATING SOLUTION MAINTENANCE

For small-size ruthenium baths (up to 3-5 liters) we advise to use the product until the ruthenium solution is completely exhausted and dispose without adding any replenisher concentrate solution. For larger-sized baths add RU5R which is a pre calibrated replenisher containing additional ruthenium in concentrate form to restore the optimal ruthenium concentration. For perfect galvanic bath performance, it is advisable to maintain the ruthenium concentration at values not lower of 80% of the initial concentration; for example, with a bath operating at a concentration of 5 g/l, additions should be made after a maximum consumption of 1 g/l of ruthenium maximum. When introducing additional metal keep in mind that in optimum working conditions a bath working at 5 g/l normally deposits about 3 mg of ruthenium per Ampere/minute.

PRETREATMENTS

The plating solution RU5GRAY can be directly deposited on Gold, Palladium, Nickel and its alloys. For Silver, Copper and Copper alloys a flash of Pd will act in prevent copper migration to the external surface for the treated items.

As pre-treatment it is suggested to run a preliminary degreasing through a cycle of ultrasonic degreasing treatment -solution followed by a wash step into running water. Then proceed with the electrolytic degreasing step by using the alkaline degreasing solution SGR1. Once the items has been washed again in demineralized water, then proceed in activate and neutralize the surface of the same by dipping them into the slightly acidic solution NEUT1 for 3 – 4 times subsequently at room temperature, in order to be sure that no any alkaline residues coming from the degreasing previous steps are dragged into the rhodium solution together with the same items to be treated (which would lead to a reduction of its life). After the neutralization, wash in demineralized running water and immerse the pieces in the Pd plating solution for the platingtreatment.

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POST TREATMENTS

The electrolyte should be removed from the surface as quick as possible. For optimum results follow this steps: A) wash off the plating solution residues in a recovery rinse (static rinse); B) wash the treated items in hot deionized water (80°C): this will help in gain more brightness and luminosity; C) rinse the parts in circulating deionized water; D) dry.

In the case a problem is observed, replace step B) with a rinse in concentrated ammonium hydroxide (ammonia) solution for 5 minutes. This action should be preformed under an exhaust - hood.

WATER PURITY

To prevent contamination of the plating solution during any replenishing operations, use demineralized water with a conductivity of less than 3 $\mu\text{S}/\text{cm}$ (containing no traces of organic compounds, Chlorine, Silicon, or Boron). To achieve maximum deposit quality we suggest to use our high-grade purity WATER.

ABOUT pH

pH is a very important parameter especially when working on high thickness layers. The pH value must be frequently controlled and held under optimal values numerically described in the operating data table. In the case corrections are needed, use Ammonium hydroxide to raise the pH, and RU5S conductive salts to lower it.

ABOUT SOLUTION DENSITY

Solution density is not a critical parameter. In the case of heavy productions, it is advised to check the density periodically. As the density lowers in value, restore to its optimum working range by using RU5S conductive salts. Adding 10 g/l of RU5S will raise the solution density of about + 1°Bé.

SAFETY INFORMATION

Being an acidic solution, the electrolyte is corrosive therefore is an irritant to the skin, eyes and mucous membranes. Caution should be exercised when using the product, avoiding contact with the eyes and skin. Use gloves and safety goggles. Keep away from cyanide based chemicals. For further information please refer to the relative MSDS.

DISCLAIMER

All recommendations and suggestions in this bulletin concerning the use of our products are based upon tests and data believed to be reliable. Since the actual use by others is beyond our control, no guarantee expressed or implied, is made by Legor Group, its subsidiaries or distributors, as to the effects of such use or results to be obtained, nor is any information to be construed as a recommendation to infringe any patent.