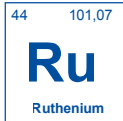


## Ruthenium-R-5

High Quality Ruthenium Electrolyte for  
Deposition of Ruthenium on Electronic Devices





Precious metal baths

## Ruthenium-R-5

### Technical data

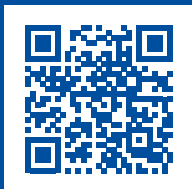
Ruthenium content:	5 (10)g / L (range: 4 - 8 g / L (8 - 12 g / L))
pH value:	1.5 (range: 1.0 - 1.8)
Working temperature:	70°C (range: 60 - 75°C)
Density:	1.02 g / cm <sup>3</sup> (1.04) (range: 1.02 - 1.04 g / cm <sup>3</sup> (1.04 - 1.12))
Voltage:	1.7V (at 1 A / dm <sup>2</sup> ) (range: 1.4 - 1.9V)
Current density:	1 A / dm <sup>2</sup> (range: 0.8 - 1.2A / dm <sup>2</sup> )
Current efficiency:	10 mg / Amin (range: 8 - 12 mg / Amin)
Exposition time for 1 µm:	12 min with 1 A / dm <sup>2</sup>
Coating thickness w/o Blackening additive:	up to 1 µm
Coating thickness with Blackening additive:	up to 0.3 µm

### Bath Preparation:

The necessary components for 100L volume are as follows:

Ruthenium concentrate (50g / L)  
for preparation with:

- ◆ 5g / L Ru => 10L and 90L deionized water
- ◆ 10g / L Ru => 20L and 80L deionized water



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**Ruthenium-R-5** is an acidic electrolyte for the deposition of ruthenium on electronic devices e.g. reed contacts. The coatings are very hard (about 800 HV), maintain brightness and show high corrosion resistance.

Although ruthenium coatings have a greyish colour, they have the same functional characteristics of rhodium layers and may therefore be a less expensive alternative to rhodium. For decorative purposes, the **Ruthenium-R-5** is commonly used as **BLACK Ruthenium-R-5**. The intensity of the black colour may easily be controlled by the concentration of the blackening additive.

### Process Sequence

Before electroplating with ruthenium, all residual grease, polishing powder and oxides have to be removed from the surface. We recommend to degrease in separate cleaning baths, first in a hot alkaline cleaner followed by electrolytic degreasing.

After thorough rinsing with water, the parts should be pickled in diluted acid and again rinsed in water. Then a precoat of gold is deposited, before the parts are degreased again electrolytically, rinsed finally and can then be placed in the **Ruthenium-R-5** process solution.

Material made of zinc, tin, lead, iron and special bronze, must be provided with a sufficiently thick and dense layer of copper or nickel prior to ruthenium plating.

After removal from **Ruthenium-R-5**, the plated material is immersed in a spare rinse in order to gain adhering electrolyte solution.

Then it is to be rinsed in running water, subsequently immersed in a warm, diluted solution of sodium hydroxide (50g / L NaOH) for 2 - 4 minutes in order to neutralize adhering electrolyte solution completely. Intensive rinsing in running water should be the last process step before drying.

The spare rinse solution must not be added to the process solution because insoluble hydrolysis products precipitate.

## Equipment

**Tank:** Polypropylene or polyethylene tanks with exhaustion should be used

**Filtration:** Filtration pump for a continuous electrolyte movement; filtration of the electrolyte through polypropylene cartridges

**Heating:** Bath heaters in porcelain or glass with thermostatic control for the temperature range 60 – 75°C

**Rectifier:** With continuous regulation

**Anodes:** Platinum plated titanium mesh (anode / cathode area relation of 2:1)

**Bath agitation:** Bath agitation is necessary, an additional cathode agitation is recommended

## Delivery Form and Bath Preparation

- ◆ The plating tank is thoroughly cleaned and filled with deionized water up to a quarter of the total volume.
- ◆ Addition of the ruthenium concentrate with continuous stirring.
- ◆ Filling up to the total volume with deionized water.
- ◆ Heating up to the operating temperature (70°C).

Small volumes are possibly supplied ready for use.

## Maintenance

Replenishing of the ruthenium content to maintain the recommended concentration is effected by adding ruthenium concentrate, containing 50 g / L Ru and other components essential for plating.

The pH-value has to be kept between 1.0 and 1.8. For the adjustment of the pH-value ammonia or diluted sulphuric acid are used, respectively.

On normal working conditions, about 50 g Ru are deposited in 5000 Amin.

## Safety and Disposal

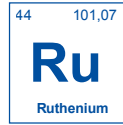
**Ruthenium-R-5** contains free acid and is classified as irritant. Before working with this electrolyte, take notice of the safety data sheet. This electrolyte contains substances seriously hazardous to water resources.

It should not be discharged untreated into the public sewer system or natural water courses.

For the disposal of used electrolytes or drag-out rinse solutions containing precious metals, we recommend reprocessing by a refinery.

Solutions free of ruthenium have to be detoxified in accordance with the local waste water treatment regulations.



**Blackening Additive****Ruthenium-R-5-B**

For the blackening of the ruthenium deposit, 2 - 6 ml blackening additive **Ruthenium-R-5-B** are added per gram ruthenium metal to a new bath. The necessary amount depends on the desired intensity. In order to maintain the intensity of the black colour, a steady replenishment of about 4 ml blackening additive **Ruthenium-R-5-B** / g Ru is recommended during bath operation.

Because of the high working temperature (70°C), the black dye decomposes slowly even during working intermissions. Before continuing, the intensity of the black colour has to be adjusted by replenishment of blackening additive.

**For further information  
please contact us:**

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