NIBRITE 5500

NEXT GENERATION BRIGHT NICKEL

INTRODUCTION

The NiBrite 5500 process has been developed to produce fully bright, highly levelled, ductile nickel deposits. NiBrite 5500 additive systems are highly concentrated providing benefits of extremely low addition rates, a particular feature of the 5500 process is its separate Leveller which combats the problems associated with high and low current density deposits.

The process can be used for rack or barrel plating.

BENEFITS

- Excellent levelling capability
- Bright and level deposit across entire current density range
- Addresses low current density brightness
- Uses separate leveller for enhanced control
- Very concentrated additives
- Easy to maintain
- Suitable for rack and barrel

SOLUTION MAKE–UP

The NiBrite 5500 process is supplied as a purified Base Solution (rack or barrel), to which is added the NiBrite 5500 Bright-Carrier and Leveller.

Nickel Base Solution	Suggested Make Up: Nickel sulfate hexahydrate– 290 g/L Nickel chloride hexahydrate – 55 g/L (Rack) / 150 g/L (Barrel) Boric Acid – 43 g/L
NiBrite 5500 Bright-Carrier	9 ml/L (0.9% by volume)
NiBrite 5500 Leveller	0.5 ml/L
NiBrite 5500 Wetter or Nickel Wetter AP	1.8 ml/L (air agitation) 0.5 ml/L (mechanical agitation)

INSTALLATION

It is essential that the tanks to be used for NiBrite 5500 are thoroughly cleaned and leached before any product is introduced. If in any doubt as to the cleaning procedure please contact ACS Technical Department.

1. Add Nickel Base Solution to tank.
2. Add NiBrite 5500 Bright-Carrier, Leveller and relevant Wetter as required.
3. Heat to operating temperature.
4. Electrolyze for 4 hours at 10-20 ASF.

OPERATING DATA

	Rack	Barrel
Nickel	60 – 70 g/L	60 – 70 g/L
Nickel chloride	50 – 60 g/L	140 – 160 g/L
Boric acid	40 – 45 g/L	40 – 45 g/L
pH	4.2 – 4.5	
Temperature	120 – 140°F	
Cathode Current Density	2 – 50 ASF	
Anode Current Density	10 – 40 ASF	
Agitation	Air, cathode or solution movement	
Anodes	Depolarized or carbon containing nickel. Alternatively, 'S' Nickel in titanium baskets. Polypropylene woven anode bags which have been thoroughly leached in hot water should be used.	
Deposition rate	1 micron/minute (40µ"/min) at 50 ASF	

EQUIPMENT

Tanks	Polyethylene or polypropylene. Welded PVC or polypropylene
Heaters	PTFE or titanium clad electric immersion heaters
Filtration	Continuous filtration recommended
Ventilation	Required

MAINTENANCE AND CONTROL

The solution should be analysed regularly and replenished as necessary. (See Analysis Methods)

The NiBrite 5500 Bright-Carrier and Leveller should be added on an ampere hour basis:

NiBrite 5500 Bright-Carrier	50 – 100 ml/1000 amp hours (1 gal per 38 – 75,000 AH)
NiBrite 5500 Leveller	30 – 100 ml/1000 amp hours (1 gal per 1 – 3.3 gals Bright-Carrier)
NiBrite 5500 Wetter	As required or alternatively add 30 – 70 ml/1000 amp hours

pH should be kept within the range 4.2 – 4.5 with additions of sulfuric acid (10% v/v) to lower or sodium hydroxide (100 g/L) to increase. During use the pH will increase slowly.

NOTES

Current Density: For barrel plating 1 – 10 ASF is recommended, and for rack plating 20 – 50 ASF. For the high current densities in rack plating vigorous air agitation is recommended.

Wetting Agents: For air agitated bath NiBrite 5500 Wetter is recommended to be added at 1.8 ml/L. For mechanically agitated baths NiBrite 5500 Wetter is recommended to be added at 0.5 ml/L.

ANALYSIS METHODS

1. Chloride

Reagents

0.1N silver nitrate (standard volumetric solution)
Sodium hydrogen carbonate
20% w/v potassium chromate solution

Method

1. Cool a sample of the solution to room temp.
2. Pipette a 5.0 ml aliquot into a 250 ml conical flask.
3. Add 100 ml DI water.
4. Add 2 g sodium hydrogen carbonate and stir until dissolved.
5. Add 2-3 drops 20% potassium chromate solution.
6. Titrate with 0.1N silver nitrate to an orange end point.
7. Record titre = t mls.

Calculation

t x 2.378 = g/L nickel chloride

Replenishment

For every 1 g/L required add 1 g/L nickel chloride

ANALYSIS METHODS (con't)

2. Nickel

This analysis method should be carried out after any additions of nickel chloride have been made.

Reagents

0.2N EDTA (Standard volumetric solution)
Ammonia solution
Murexide indicator

Method

1. Cool a sample of the solution to room temperature.
2. Pipette a 2.0 ml aliquot into a 250 ml conical flask.
3. Add 100 ml DI water.
4. Add 10 ml ammonia solution.
5. Add a pinch of murexide indicator.
6. Titrate to a purple end point with 0.2N EDTA.
7. Record titre = t mls.

Calculation

t x 2.935 = g/L Nickel

Replenishment

For every 1 g/L nickel required add 4.48 g/L of nickel sulfate▪$6H_20$

3. Boric acid

Reagents

0.1N sodium hydroxide (standard volumetric solution)

Buffer solution (Dissolve 60 g/L sodium citrate in 100 ml DI water. Add 600 ml glycerol. Dissolve 2 g phenolphthalein in 10 ml methanol and add to the mix. Make up to 1 liter with DI water).

Method

1. Cool a sample of the solution to room temperature.
2. Pipette a 1.0 ml aliquot into a 250 ml conical flask.
3. Add 25 ml of buffer solution.
4. Titrate slowly with 0.1N sodium hydroxide to the first permanent pink end point.
5. Record titre = t mls.

Calculation

t x 6.184 = g/L boric acid

Replenishment
For every 1 g/L low add 1 g/L boric acid

STORAGE

Store in original containers above 40°F

SAFETY

CAUTION! NiBrite 5500 working solutions contain acidic components. Avoid contact with eyes, skin and clothing. Wear chemical handler's gloves, goggles and protective clothing when handling. Read and understand all Material Safety Data Sheets before using this product.

PRODUCT GROUPS

The following products are referred to in this data sheet.

PRODUCT NAME	PRODUCT NUMBER
NiBrite 5500 Bright-Carrier	544033
NiBrite 5500 Leveller	544034
NiBrite 5500 Wetter	544035

NOTICE

The information and recommendations of PMD (UK), Ltd. and Automated Chemical Solutions, Inc., and its representatives, regarding this product are, to the best of our knowledge, true and accurate. We make no guarantee of results because the conditions of actual use are beyond our control. We assume no liability for damages or penalties resulting from the use of this product or following our recommendations. Our recommendations and suggestions for use of this product are not intended to grant license to operate under or infringe any patent.