

NICKELEX INSTRUCTIONS

Improved Electroless Nickel Plating Solutions

Instructions for Use

PROCEDURE FOR SILICON RECTIFIERS

To obtain the best nickel adhesion and quality electrical contacts, the following procedure is recommended:

Abrade silicon surface by means of lapping with size 200-600 carborundum grit. Sandblasting with S.S. White abrasive unit is also satisfactory. Clean thoroughly with ultrasonic detergent with water rinsing.

Soak in hydrofluoric acid (48%) for at least 15 seconds; then rinse in distilled or deionized water to remove HF.

Place NICKELEX solution in a Pyrex beaker, heat the solution to 95-98 °C, then drop in silicon for electroless plating.

Electroless plate for five minutes. Remove plated silicon, and rinse in water, dry it.

Sinter the nickel plate by heat treatment at 700-800 °C for five minutes using a non-oxidizing atmosphere such as nitrogen or forming gas. In special cases, the time may be minimized to limit diffusion of nickel, as for shallow p-n junctions.

Place heat-treated silicon again in hydrofluoric acid (48%) for ten seconds; rinse in water; dry; then re-plate electroless nickel at 95-98 °C for five minutes. Finally rinse in water and dry.

NOTE: When heat treatment is not practical, the operations outlines steps 1-4 should be followed with the exception that *iso*-propyl alcohol replaces the rinse water in step 2.

PROCEDURE FOR PLANAR SILICON DEVICES

Soak in Buffer HF Improved ([901657](#), [901667](#)) for 1-2 seconds, then rinse in deionized water.

Place NICKELEX plating solution in a Pyrex beaker, heat the solution to 95-98 °C, then drop in silicon wafers for electroless plating.

Remove silicon wafers as soon as complete coverage is obtained. Generally, one minute suffices. Avoid thick deposits which may peel off on polished surfaces. Rinse in deionized water thoroughly and dry.

Sinter the nickel plate at 450-500 °C for five minutes in a non-oxidizing atmosphere. Higher temperatures are used when p-n junction depth is not too shallow.

Re-plate electroless nickel for five minutes. Remove, rinse in deionized water, and dry.

NOTE: Polished silicon surfaces often exhibit non-uniform surface potentials and consequently may not plate uniformly. Areas on the silicon surface may even resist electroless plating. These conditions are controlled by sensitizing the silicon surfaces to equalize surface potentials prior to electroless nickel plating. Transene silicon surface sensitizer should then be used.

The process, based on the use of sensitizer, is as follows:

Soak in Buffer HF Improved for 1-2 seconds; rinse in water as above.

Soak in sensitizer for 1 minute; rinse in water.

Heat treat at 500 °C for five minutes in a non-oxidizing atmosphere.

Electroless nickel plate, sinter, and electroless nickel plate again as above.

PROCEDURE FOR GERMANIUM, GALLIUM ARSENIDE, AND CADMIUM SULFIDE:

The procedures outlined above apply in general to other semiconductors with some notable exceptions. The heat treatment temperature for GaAs is 500 °C. Heat treatment for CdS may or may not be desirable, depending upon the application.

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