Panasonic

Equipment Status: Set as UP, PROBLEM, or DOWN, and report the issue date (MM/DD) and a brief description. Italicized fields will be filled in by BNC Staff in response to issues. See Problem Reporting Guide for more info.

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Panasonic E620 Etcher

iLab Name: Panasonic
iLab Kiosk: BRK Etch Core
FIC: Shared
Owner: Francis Manfred
Location: Cleanroom - K Bay
Maximum Wafer Size: 6”/150 mm

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Overview
General Description

This inductively coupled plasma system etches a wide variety of substrates, including III-V materials, polymers, and metals.

Specifications

The Panasonic E620 is a plasma etch tool capable of using a 1250 watt inductively coupled RF plasma and 600 watt capacitive bias allowing for highly anisotropic etches. It etches a wide range of materials using Ar, CHF3, CF4, SF6, Cl2, N2, O2, and BCl3 as process gasses. Samples are cooled by way of helium backside cooled electrostatic chuck. Additional features include end point monitoring, error logging, and storage for 99 recipes.

Technology Overview

Gold (Au), Silver (Ag), Copper (Cu), and Platinum (Pt) are NOT allowed in the chamber in any amounts.

Sample Requirements and Preparation

Samples must be mounted to a 150 mm JEIDA standard wafer. Common mounting adhesives are crystalbond and photoresist. "Panasonic wafers" can be purchased from the building supply room during office hours. Gold, silver, copper, and platinum do not have a vapor phase etch byproduct, and are therefore not allowed in the chamber. E-mail the tool engineer for more information on permissible materials.

Standard Operating Procedure

Supplements:

Recovery of wafer in Load Lock

Questions & Troubleshooting

Why won't recipe 103 (Post Chlorine Clean) run?
Check your process gases. That CF4-based recipe won't run if SF6 is enabled. Note that the same protections are not enabled on user-created recipes.

How do I add those protections to my CF4 based recipes?
Copy step 1 from recipe 103 into your recipe. The step flows the gas at 160 sccm. If SF6 is currently selected gas it won't be able to flow, and cause your process to abort before any damage is done.
Is the Panasonic capable of End Point Monitoring (EPM)?

While the tool is equipped with end point detection capabilities, using EPM requires new and specific setup for each different material stack. Additionally, the knowledge of how to setup and operate EPM was lost some time ago. Please contact BNC staff if you are interested in using /learning how to use these capabilities. These documents are available as references: Procedure of EPM setting (Internal Resource), and EP M manual (Internal Resource).

Do I need to adjust the Cooling Helium flow rate or pressure?

Generally the helium flow rate is not important to the etch itself, it is present to monitor a leak in the ESC clamping of the substrate. However, helium pressure has a direct effect on the cooling of the substrate and may need to be adjusted. Pressures from 400 to 1000 Pa are reasonable for most processes.

Do I need to use crystal bond to mount my sample to the carrier wafer?

Crystal bond (or another adhesive, discuss with Sean if you would like to use something else) is necessary both to keep the sample from flying off in the chamber, and to establish good thermal contact between the sample and the carrier wafer. The lack of crystal bond (or another thermal compound) will cause poor and inconsistent cooling for your sample, leading to inconsistent results of the etch process.

Process Library

Manufacturer recipes (Internal Resource)
Titanium Etch (Internal Resource)
CF4 Clean (Post Cl etch clean) (Internal Resource). Standard and up-to-date recipe is already on tool, this potentially out of date version is provided here only for reference.
Oxide vertical etch (Internal Resource)
O2 clean (Internal Resource)
Oxide clean and coat (run prior to CHF3 etching) (Internal Resource)
Oxide etch, high selectivity (Internal Resource)
Cl2 clean and coat (before Cl etch) (Internal Resource). Standard and up-to-date recipe is already on tool, this potentially out of date version is provided here only for reference.

Etch material notes:

SiC is very difficult to etch isotropically, and etching of the sidewalls only occurs via heating.

References

Manufacturer References:

Purdue Manufacturer Acceptance Test (Internal Resource)
Manufacturer Website
Manufacturer Manual (Internal Resource)
Recover from Abnormal Shutdown (Internal Resource)

Literature References:


External Facilities:

"ICP Etching Recipes," UCSB