

JLAB-TN-02-007

Maud Baylac, 02-11-02

Electron Gun Group

Hydrogen / Deuterium cleaning procedure

This note describes the use of the Hydrogen dissociation apparatus in the portable chamber

Prerequisites

The following procedure assumes that the wafer is ready to be hydrogen cleaned. This means that :

- The stalk has been installed in the portable Hydrogen cleaning chamber. If needed, make sure that the orientation of the stalk is correct.
- The vacuum in the main gun chamber is acceptable (*ie*: few μA).
- Program and start the stalk heat cycle. It should have at least 15 min at 600 C and then reach 300 C for the cleaning itself.
- Make sure that the convectron is far away from the RF source.
- Insure proper cabling: RF oscillator and amplifier, picoammeter, bias, photodiode, convectron.
- Record ion pump current, photodiode signal, temperature before starting.

The cleaning procedure

- 1) Close the shutter.
- 2) Turn on the bias and the picoammeter. Start the ion counter (Picoammemeter chart) on the PC. The frequency of data taking should be 1 Hz.
- 3) When at 300C, insure sufficient time at temperature for adjusting the dissociator and cleaning. Make sure the turbo pump is running, valve open, then slowly open the valve regulating the Hydrogen/Deuterium arrival until the ion pump current reaches ~ 2 mA (*ie*: ~ 12 mTorr on the convectron).
- 4) Turn on the RF amplifier and oscillator. Optimize the RF frequency in order to obtain a bright purple color as high in the glass as possible and to maximize the ion flux read by the picoammeter.

- 5)** Some typical settings are:
- Ion pump, before: 4 μ A
 - Ion pump, with H: 2 mA
 - Convectron : 15 mTorr
 - Incident power: 52 W
 - Reflected power: 30 W
 - Photodiode, before H: 85 mV
 - Photodiode, with H: 146 mV
 - Temperature: 300 C
 - Frequency: 96 MHz
 - Maximum ion flux (picoammeter) : -8 μ A
- 6)** When everything looks stable, remove the shutter. Watch the change in the ion counter and note the value of the counter at that start time. Record the start time.
- 7)** Record all of parameters listed in 5 in the logbook.
- 8)** Keep watching the ion counter and when it reaches the desired cumulative count (or when the desired cleaning time is reached), insert the shutter. Watch the ion counter change. Turn off the RF oscillator and power, close the Hydrogen flow. (NB: 15 minutes of Hydrogen cleaning corresponds to about 7,000 ions. in the above conditions).
- 9)** Close the Hydrogen/Deuterium valve and stop the stalk heat.
- 10)** Let the stalk cool down before removing it from the chamber.