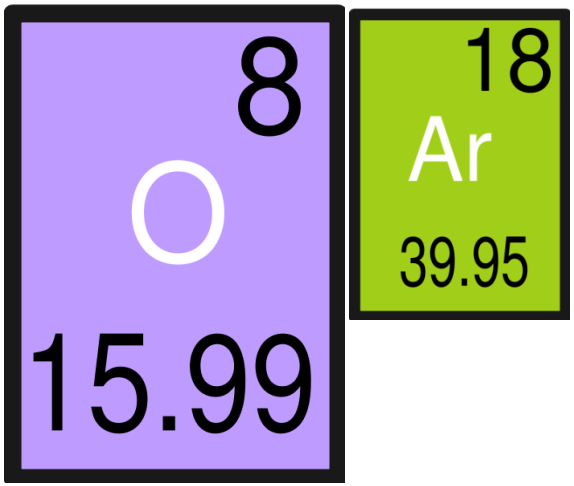
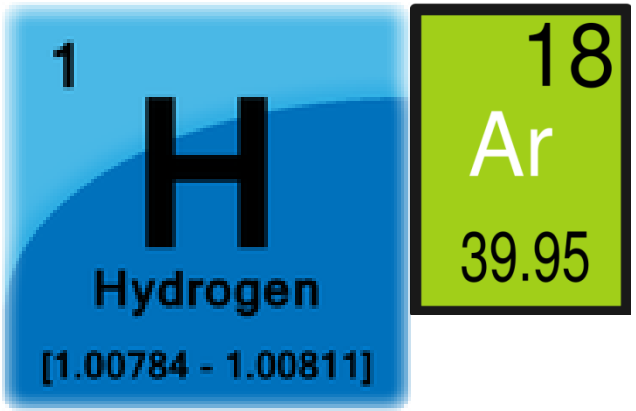
Oxygen & Hydrogen
Low-Pressure RF Plasma Cleaning

ibss Group, Inc.



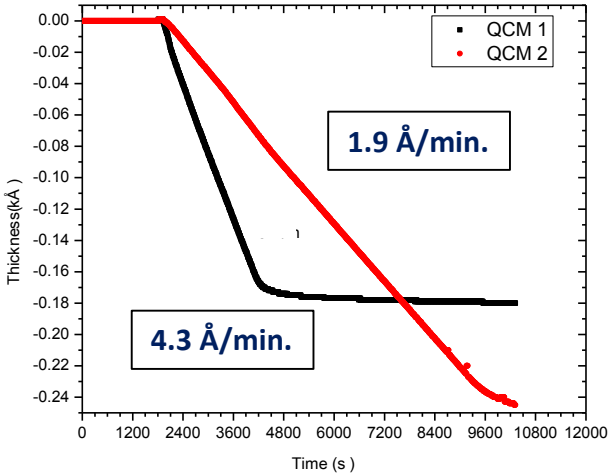
&



O_2 Plasma Cleaning of Test Mirror as Provided by SSRF

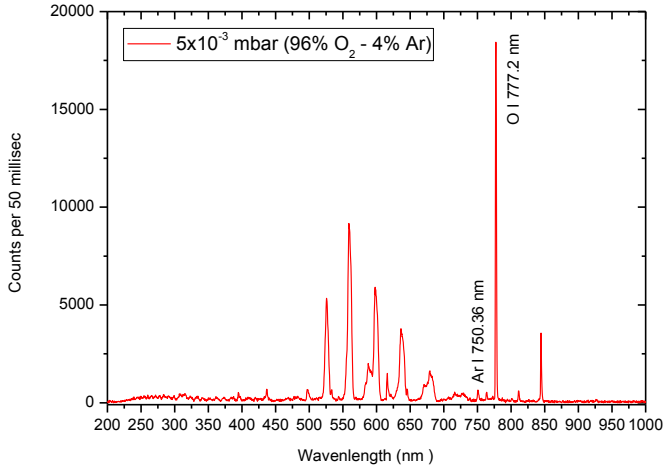
ibss Group, Inc.

Carbon thickness as a function of time:



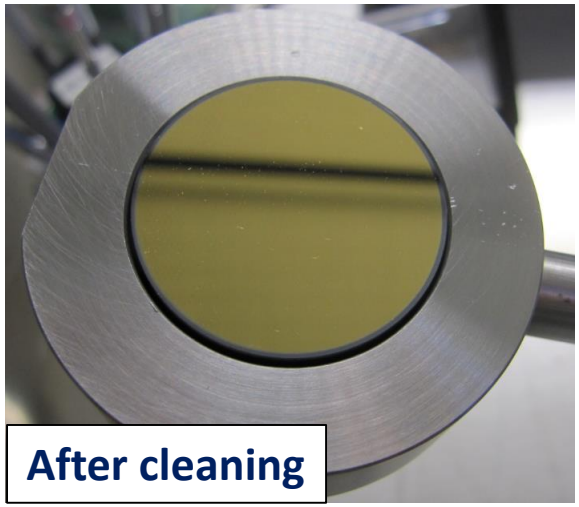
⇒ **Fast & safe carbon contamination cleaning**

Optical emission from O_2/Ar plasma:



⇒ **Neutral O• radicals as chemically active species**

⇒ **Neutral H• radicals for H_2 plasma.**

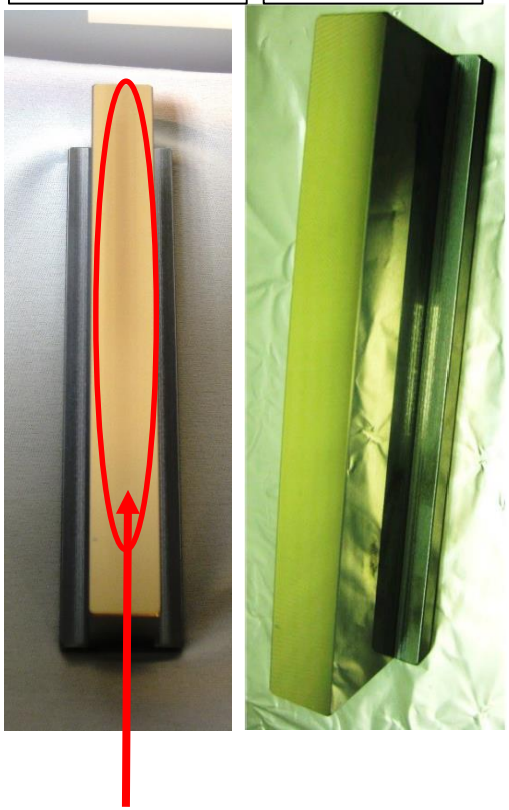


O_2 Plasma Cleaning of High-Energy Grating

ibss Group, Inc.

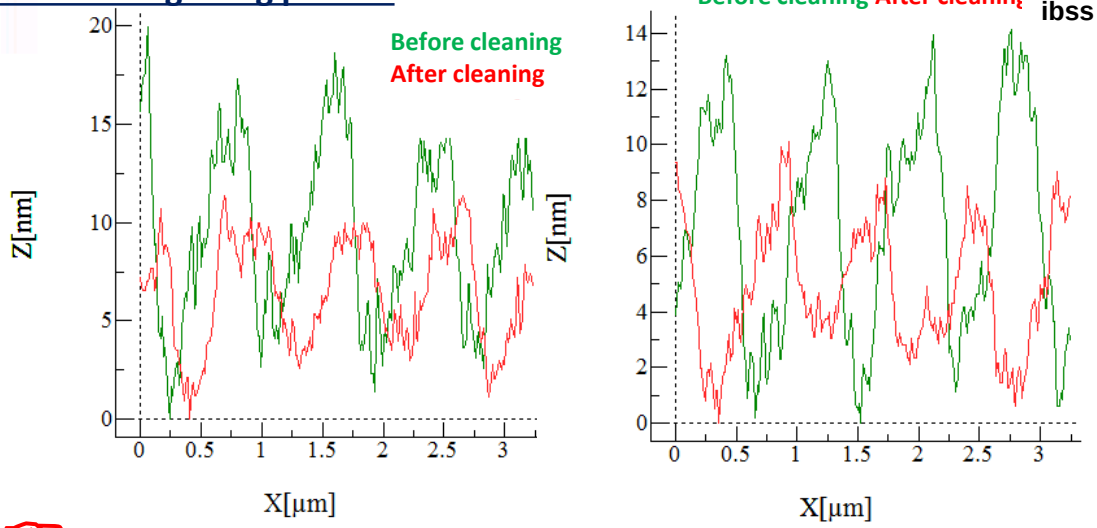
1200 l/mm, 0.85° blaze angle, plane Si blank, 35 nm Au coating, no Cr buffer layer.

Before cleaning: | **After cleaning:**



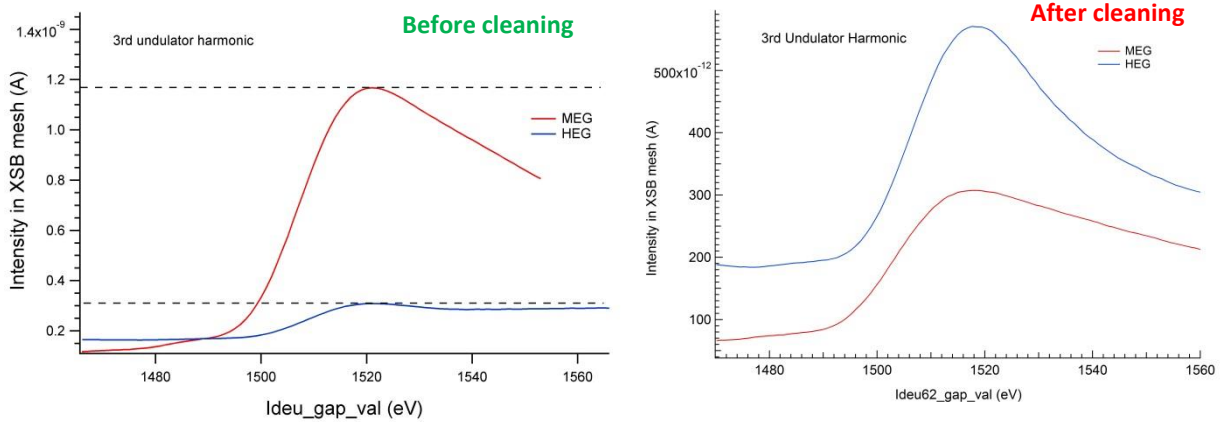
Photon beam footprint with C contamination trace.

AFM scans of grating profile:



☞ **Recovery of "as-delivered" blazed grating profile.**

Photon flux measurements downstream exit slit:



☞ **Increase of grating efficiency by factor of *7.6* by cleaning.**

Results from RF Plasma Cleaning with GV10x

ibss Group, Inc.

- Quantitative results for optimum cleaning rates.
- GV10x gun with better performance than “classical” capacitive RF antenna gun.
- O_2/Ar plasma good choice for Au surfaces (fast & safe)
- H_2/Ar/Ne plasma good choice for Ni and Rh (slower, but ***non-oxidizing***)
- Blank Si surfaces tricky to clean.

Other results:

- Cleaning of high-energy grating of Circe soft x-ray beamline with full recovery of grating profile and performance.
- Up-scaling of in-situ cleaning process to realistic large UHV mirror systems.