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Etching AR Coatings with Liquinox

Margot Phelps Liyuan Zhang

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# Introduction

This documents work done in 2011 at CIT, etching AR coatings layer by layer with a warm Liquinox solution.

# Liquinox Solution

Lined bottom of a large pyrex container with an optics wipe, and added a magnetic stirring rod. The rod is useful to keep uniform temperature and homogenous solution, so etching should be more uniform. Measure out a 25% Liquinox and DI water solution, pour into the clean pyrex container, over the wipe and stir rod. Bring the mixture up to 70C using a digitally controlled hotplate to control and provide heat. Keep the stirring rod stirring slowly throughout the whole experiment.

When temperature has equalized, carefully place optics in the bottom of the container, on the wipe. Let soak for desired amount of time. When done, remove optics and hold under a flowing DI water source for at least two minutes. Can wipe gently at this point with another clean wipe, under the water flow. Once all Liquinox seems to be gone, drive off water with methanol or acetone, and quickly dry with an ion gun.

## Materials

Hotplate (and controller)

Large pyrex container

Alpha wipes

DI water source

Liquinox

Methanol or acetone

# Etching results

AR coating of SiO2 and Ta205. This etch did not work on the tantala, but removed a measurable amount of the SiO2 coating per how much time it was left in a 25%, 70C Liquinox bath.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Etch | % Liquinox | Temperature(C, ±2oC) | Time (min) | Coating removed (nm) |
| 1 | 25 | 43 | 10 |  |
| 2 | 1.7 | 65 | 10 |  |
| 3 | 2 | 65 | 30 |  |
| 4 | 25 | 70 | 30 |  |
| 5 | 25 | 70 | 120 | 45 |
| 6 | 25 | 69 | 240 |  |
| 7 | 25 | 75 | 240 |  |
| 8 | 25 | 65 | 120 |  |
| 9 | 25 | 63 | 60 |  |
| 10 | 25 | 70 | 60 |  |
| 11 | 25 | 70 | 60 |  |
| 12 | 25 | 75 | 120 |  |