

# Gold etch using potassium iodide solution

INRF application note  
Process name: KIGOLDETC

## Overview

This process etches gold by using Potassium Iodide (KI) solution.

## Time needed

The time of this process depends on the thickness of the film. The etching rate of the KI solution is 0.5 – 1 um/min at room temperature.

## Materials needed

- Potassium Iodide
- Iodine
- DI water
- Glass container

## Preparation

Setup time for this process is about 5 minutes. The general recipe for KI solution is shown below:

- 4 g KI (solid)
- 1 g I<sub>2</sub> (solid)
- 40 ml DI water

## Procedure

Prepare etchant solution in the following manner. Use a digital balance to measure 4 g of KI and 1 g of I<sub>2</sub> in a glass container. Pour 40 ml DI water in the container and dissolve the solid by agitation. Put the solution in a bottle (glass or poly) and label “KI gold etchant 1:4:40 I<sub>2</sub>/KI/H<sub>2</sub>O”. Add your name and date.

To perform gold etch soak the substrate into the solution with mild agitation. Near the expected etch-time, check the substrate by DI rinse every 30 seconds until the gold color is gone. After through DI rinse blow dry the substrate.

The etchant may be re-used if clean. Put recycled etchant back in proper location (in assigned location under fume hood).

## Clean up

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If the etchant should be discarded (old or dry) dispose the waste gold etchant into an appropriately labeled plastic waste bottle. Rinse all containers three times in clear water.

### Safety and Emergency

All INRF safety and procedural regulations must be followed. Review the INRF Standard Operating Procedures for fire, chemical spill and chemical exposure. Perform all work in the fume hood with nitrile gloves and eye protection.

Iodine is toxic – may be fatal if swallowed or inhaled. It is corrosive and causes burns and harmful by inhalation and through skin absorption. It is readily absorbed through skin, very destructive of mucous membranes and upper respiratory tract, eyes and skin, a severe irritant. It sublimates at room temperature to yield dangerous levels of vapor.

Inhalation of KI dust may irritate respiratory tract. It may also act as an eye irritant, may cause sensitization or allergic reaction.

In case of exposure to skin or eyes flush immediately with water for 15 minutes. Remove all clothing that are exposed and flush with water. Report to INRF staff or report to EH&S. Seek medical attention to ensure that the burns are minimal.

In case of a large spill follow the INRF Standard Operating Procedure for chemical spills.

### References

MSDS documents for Iodine and Potassium Iodide

Prudent Practices in the Laboratory, National Research Council, 1995

W. Kern and J Vossen, Eds., *Thin Film processes*, Academic press: New York, 1978, Ch V-I

### Potassium Iodide solution gold etching Checklist

The following checklist is designed to aid the researcher when performing this process.

#### Potassium Iodide gold etch

Prepare gold etching solution:

4 g KI  
1 g I<sub>2</sub>  
40 ml DI water

## **Gold etch using potassium iodide solution**

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Soak the substrates in the etchant until the gold color is gone. The time of the process depends on the etchant rate and the film thickness.

DI rinse and blow dry

Clean up and recycle waste into a labeled plastic bottle