

Subject:	Photon Sciences Environmental Awareness for Crystal Etching (Course Code PS-ENV-CRYSTAL-ETCH)					
Number:	PS-TRN-CRM-0003	Revision:	B	Effective:	04/27/2012	Page 1 of 3

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*Approval signatures on file with master copy.

[Revision Log](#)

Instructions: Read the material below and then close this document. You will receive credit for training through the BNL training system.

Course Objective: Aspects associated with crystal etching can have a significant impact on the environment. This course has been designed to provide you with the job-specific information that you need know to protect the environment and to meet Laboratory and Government regulations for handling the waste streams produced by this operation. The contents of this training have been extracted from the Photon Sciences PRM and BNL Subject Area.

Description of Significant Environmental Aspects:

- Crystal etching operations utilize acids such as hydrofluoric acid and sulfuric acid as well as oxidizers such as nitric acid and hydrogen peroxide. The acid etches produced from the operations are RCRA hazardous wastes that need to be managed in compliance with Federal and State hazardous waste regulations.
- The waste etchants produced are reactive solutions that off-gas until the reaction is complete. Etch wastes must be stored in containers that release pressure in order to avoid container rupture that may result in injury to personnel. Accidentally mixing solvents with etch solutions (or strong acids in general) will also result in a violent reaction and must be avoided.
- Rinse water that has a pH <6 and pH >9 cannot be discharged to the sanitary system and must be collected as hazardous waste.

Training Requirements: Staff members performing crystal etching are required to read this form. Waste generators also have to take RCRA Hazardous Waste Generator training.

Operational Controls:

Non-HF containing waste etches are to be accumulated in a poly-coated, glass bottle with a vented lid. HF containing etches must be stored in plastic containers. Job-specific procedures detail how these wastes are to be managed.

Waste containers must be kept in a designated Satellite Accumulation Area (SAA) located in the area where the etching is performed. When the container is full, it shall be transferred to the 90-day Storage Area by the SAA Manager. Chemical wastes stored in a Satellite Accumulation Area must meet the following requirements.

- Waste containers must be closed at all times except when making additions.
- Containers must be labeled as hazardous waste and the contents of the waste identified (red labels are available in the 90-day Storage Area).
- The container must be kept in one of the SAA secondary containment trays and kept away from sinks or drains.
- Incompatible materials may not be stored in the same tray. Keep solvents and corrosives as far away from each other as realistically possible to avoid inadvertent mixing of waste.
- Decisions about mixing must be made in consultation with the PS ESH Staff.

Only rinse water with a pH between 6 and 9 can be discharged directly into the sanitary system.

Response to Leaks/Spills: If a spill of acid occurs, take prompt action to prevent it from discharging to floor drains or sinks if you are familiar with the hazards involved and feel comfortable doing so. If the spill is in Building 725, contact the NSLS Control Room Operator (x2550). Use the spill kits kept in the area. Any discharge to a drain, or to the outdoors, must be reported to the Lab emergency response number (x2222) and, for those in Building 725, to the NSLS Control Room Operator (x2550).

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Your Role and Responsibility: You are responsible for the proper management of your waste and to take prompt action in the event of spills. If you are ever in doubt regarding the proper course of action, contact your supervision or a member of the PS ESH Staff.

Potential Regulatory and Environmental Impacts: Mismanagement of waste can result in violations of RCRA hazardous waste regulations. Discharge of oils and other chemicals to drains can result in violations of BNL sanitary release limits. Both can ultimately result in contaminated soil or groundwater. BNL is subject to fines and penalties for such violations, and is responsible for the clean-up costs associated with any required remediation. BNL has also suffered poor public perception due to poor waste management practices and contamination events in the past. Proper management of waste and spills will help us maintain a positive relationship with regulators and the public.

Pollution Prevention and Waste Minimization: Please offer suggestions and comments to your supervision about pollution prevention and waste minimization. Disposal of hazardous waste is costly and time consuming. Please make every effort to minimize the quantity of chemicals you bring and the quantity of waste materials generated.

