

Using Acid Etch Safety to Promote Collaboration between University Professions

Liz Chartier

Cornell University



Introduction



Cornell chemistry major



Student employee at
Environmental Health and
Safety

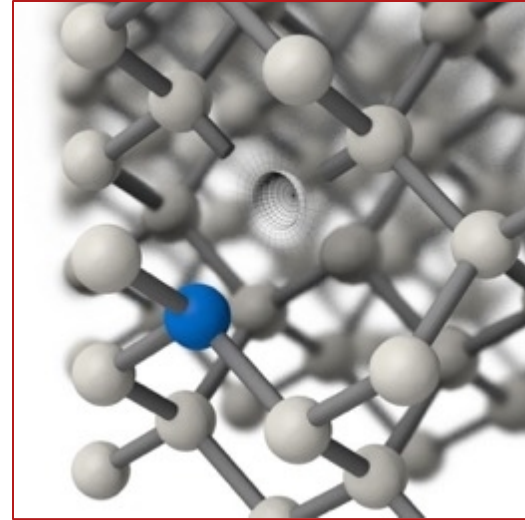
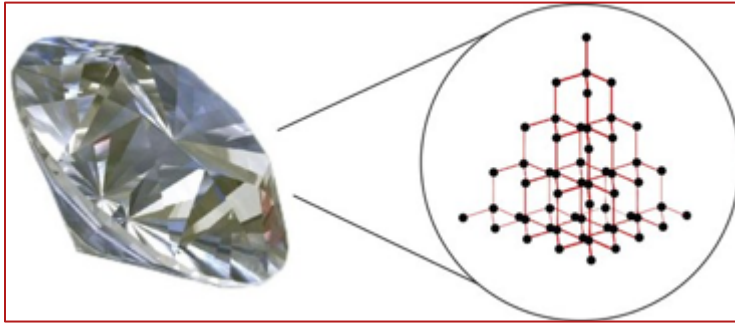
Tri-Acid Etch

- Used to clean diamonds of organic material
- Involves heating concentrated nitric, sulfuric, and perchloric acids
- Presents multiple safety hazards

Nitrogen Vacancy Centers

- Point defect in diamond
- Occur naturally but can also be artificially induced
- Used in fields such as quantum information, quantum optics, and metrology
- Usually used to study their photoluminescence

What is a Nitrogen Vacancy Center?



Concentrated Acid Mixture Dangers

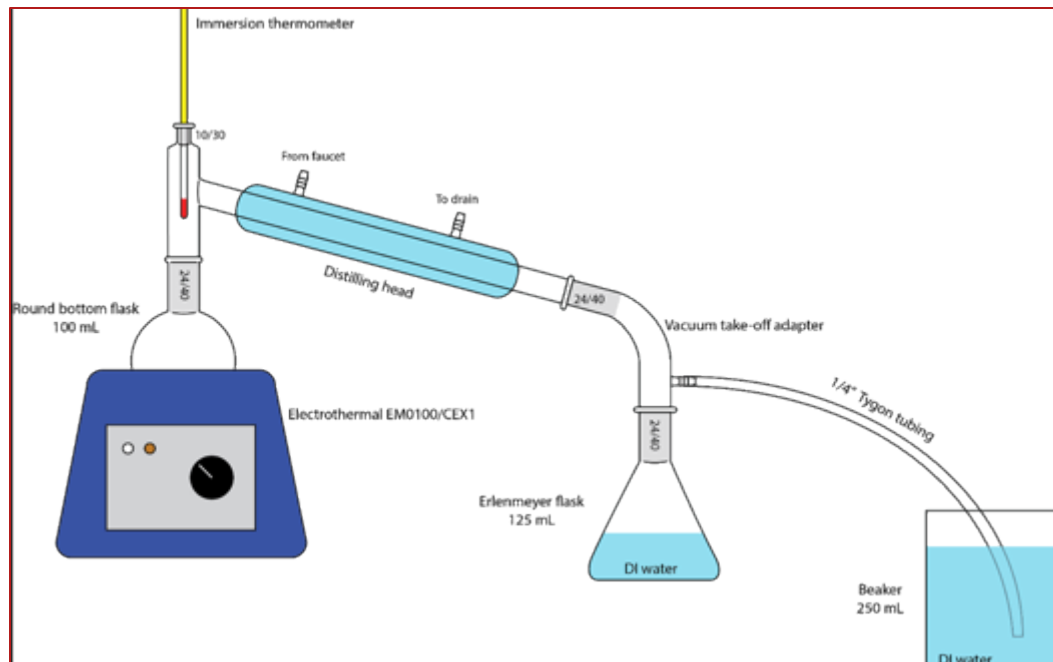
- Oxidizing
- Heating produces toxic, corrosive, fumes
- Perchloric acid vapors can form explosive crystals while cooling in ducts

Perchloric Acid Hoods

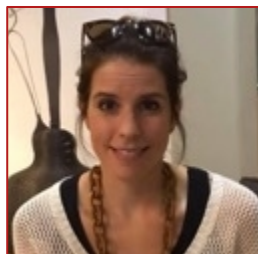
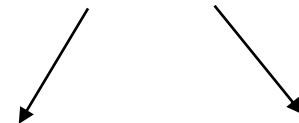
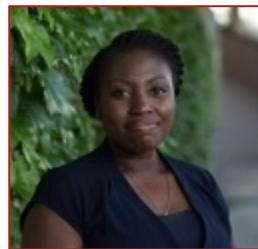
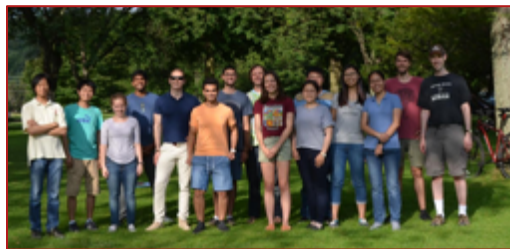
- Require preventative maintenance and monitoring
- Not commonly found in laboratories
- Many at Cornell have their wash-down feature disabled



Setup



People Involved



Collaboration

- Many people worked on solving this problem
- No literature references to using this mixture of acids to clean anything, but the procedure is commonly used
- Decide to publish!

favored method of attack following use in many existing methods of analysis. In the case of leather the present methods employ either perchloric acid alone or a combination of dry ashing and acid treatment. The more rapid decomposition of organic matter involves the use of perchloric, nitric and sulfuric acids together with promoter catalysts to hasten and temper the oxidation. The influence of such

Only available literature reference to procedure came from 1942 paper!

Creating a Paper

- Specific risks of acids
- Preventative controls
- Order of procedure
- What if something goes wrong

Summary

- Change in safety culture has promoted collaboration between researchers and EHS
- Researchers are comfortable coming to EHS with questions
- EHS can help guide researchers with conducting research safely, without compromising research goals

Thank you!

Cornell Environmental Health and Safety

Ellen Sweet
Kimberley Brown
Fuchs Group
Basset Group

Division of Chemical Health and Safety and ACS
for funding my entry to this conference

ACS Member Insurance
Protecting Life's Elements