



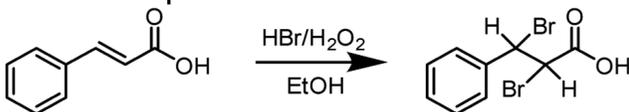
# Green Chemistry and Sustainability Efforts within the Chemistry Department at the University of Colorado Boulder



## Green Chemistry in Teaching Labs

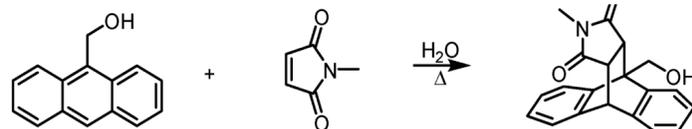
Many undergrad experiments have been redesigned to focus on green chemistry, reduce toxicity, & minimize resource use.

For example:



### Green Bromination:

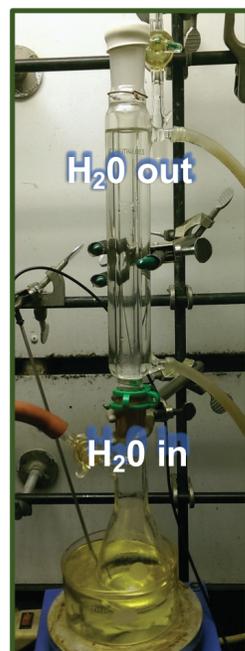
*Eliminated Br<sub>2</sub>, CH<sub>2</sub>Cl<sub>2</sub>, and large amounts of Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> (aq) waste*



### Green Diels-Alder:

*Eliminated energy intensive cyclopentadiene distillation & large amounts of water and energy to purify product*

## Water Saving Efforts

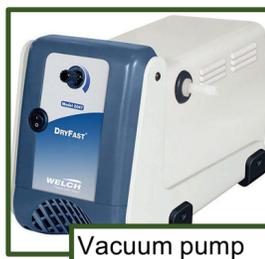


Switch to waterless  
condensers for  
medium & high  
boiling solvents



Faucet aspirator

Switch from water  
faucet aspirators to  
gravity filtration &  
vacuum pumps



Vacuum pump



Recirculating  
chillers &  
vacuum pumps  
on rotary  
evaporators

## Recycling of Lab Materials



Plastic Film



Carboys



Metal Containers



Foam



Brown Glass

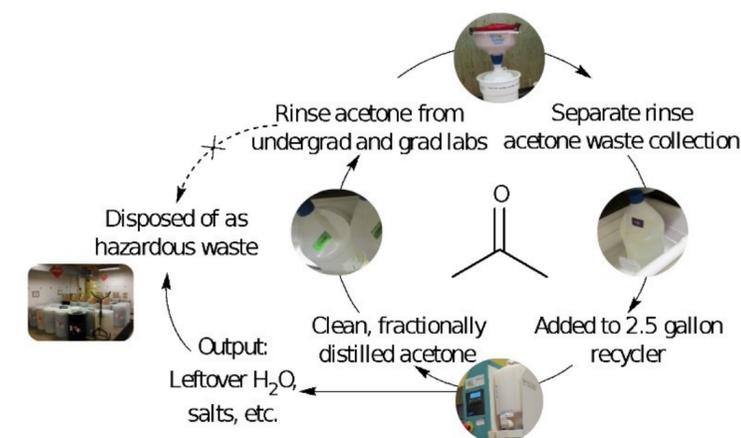


Pipette Tip Boxes

## Chemistry Acetone Solvent Recovery and Re-use 2013-2023

Total Input	2,284 gallons
Total Output	1,613 gallons
Efficiency	71%
Acetone Cost	\$18.70/gallon
Savings	\$30,160

\*at current acetone cost



## Green Chemistry Fellowship for CU Boulder Students

Univ. of Washington Green Chemistry Certification

- 3 online classes; 10 months
- From 2018-2024 13 students supported
- \$2,730 per student



## Green Chemistry Integration into CHEM 1021

- Since 2022, green chemistry content has been integrated into the introductory chemistry course.
- Green chemistry modules have been created to complement each course unit.

### CU Boulder Acknowledgements:

Chemistry Department  
Green Labs Program  
Environmental Health & Safety  
Environmental Center  
Facilities Management