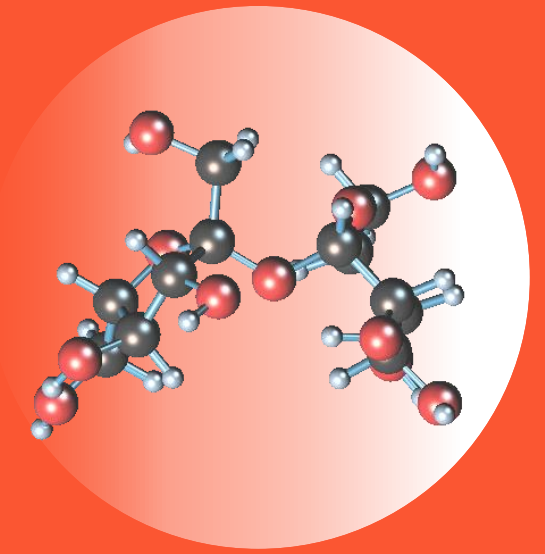
CHEM 242
Organic Chemistry Laboratory



Section AA

TA: Hao Nguyen

Introduction & NMR

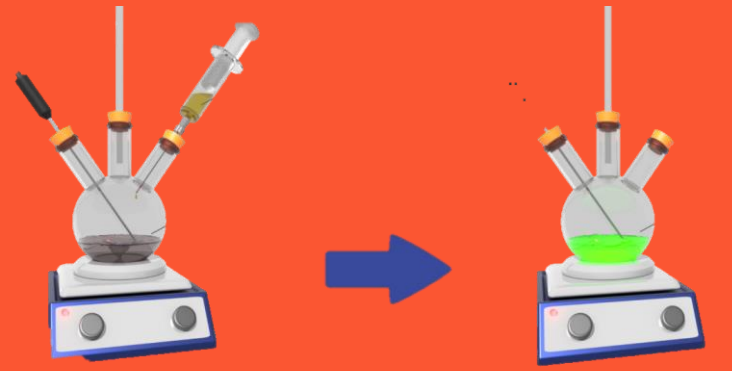
2017-2020

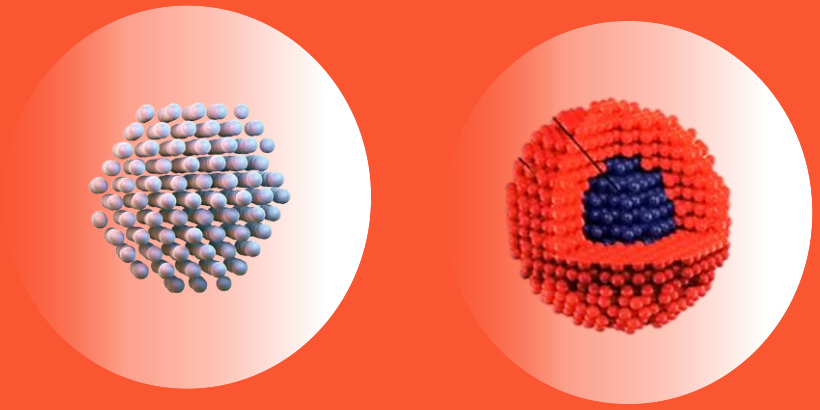
TEXAS A&M UNIVERSITY

2020

UNIVERSITY of WASHINGTON

TA: Hao Nguyen



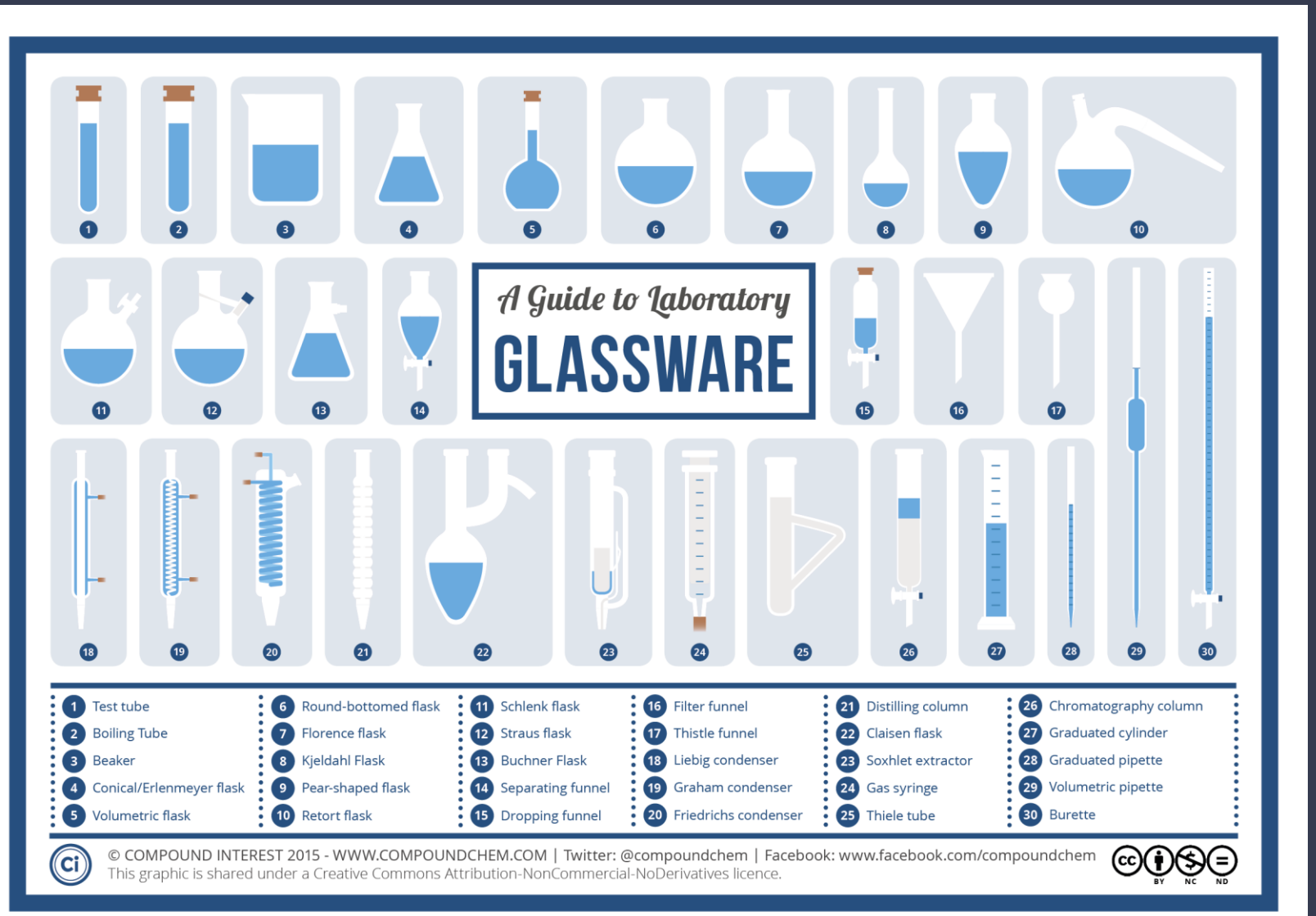


Prepare for Chemistry Lab

- Safety
- Planning
- Enthusiasm

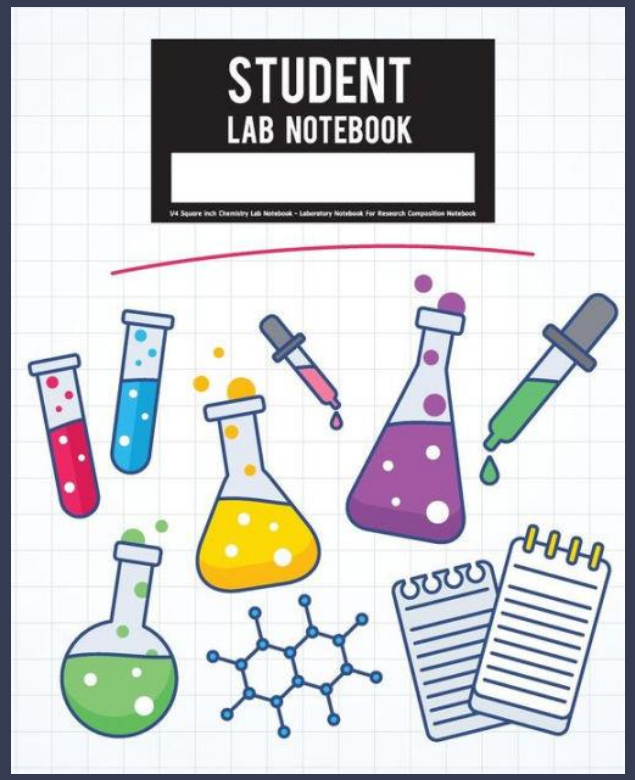
Glassware

Glassware



https://www.compoundchem.com/2015/03/17/glassware/

Notebook



https://bd3fe99d-5d75-4781-8757-74b6c56ff5f7.filesusr.com/ugd/a342ec_ef5b1b4fa5014c918997dadd98ea60a0.pdf

Disposal

How to Properly Dispose of Chemical Waste

Aqueous Waste
(<40% Organic Chemicals)

1. ***Acidic*** (pH < 4)
2. ***Neutral*** (pH ~4-10)
3. ***Basic*** (pH > 10)

A Note on Labeling:

- Indicate the content in the disposal container
- Write out all chemical names
- If the content is a mixture of chemicals, indicate the major components and list the most hazardous component(s)

Organic
(>40% Organic Chemicals)

1. ***Non-chlorinated***
   (e.g. THF, ethyl acetate, hexanes, toluene, methanol, etc.)
2. ***Chlorinated***
   (e.g. DCM, chloroform, chlorobenzene, etc.)
3. ***Chemicals in a commercial bottle***

   Undamaged bottle:
   Dispose in original bottle (no label necessary)

   Damaged bottle:
   Arrange disposal with Chem Stores

Solid Waste

1. ***Lightly Contaminated***
   - No visible loose powders
   - Collect in unlabeled green pails
   - Empty into the solid waste drums on the 7th floor

   Examples:
   Gloves, Kimwipes , paper towels, empty vials/centrifuge tubes, etc.
2. ***Chemical***
   - Loose powders
   - Heavily contaminated solid materials

   Examples:
   Used filter paper, unwanted samples, heavily contaminated gloves/kimwipes/paper towels, etc.
3. ***Silica gel***
   - Dispose in separate container
   - May not be combined with other types of chemical wastes

   
4. ***Chemicals in a commercial bottle***

   Undamaged bottle:
   Dispose in original bottle (no label necessary)

   Damaged bottle:
   Place in secondary container with a waste label

Special Cases

1. ***Sharps***
   (e.g. needles, razor blades, etc.)

   
2. ***Inorganic Oxidizing***
   - Place in a container with a disposal label

   Examples:
   Peroxides, chromates, etc.
3. ***Violently Reactive***
   - Contact Ken Greaves and Mike Dymarski

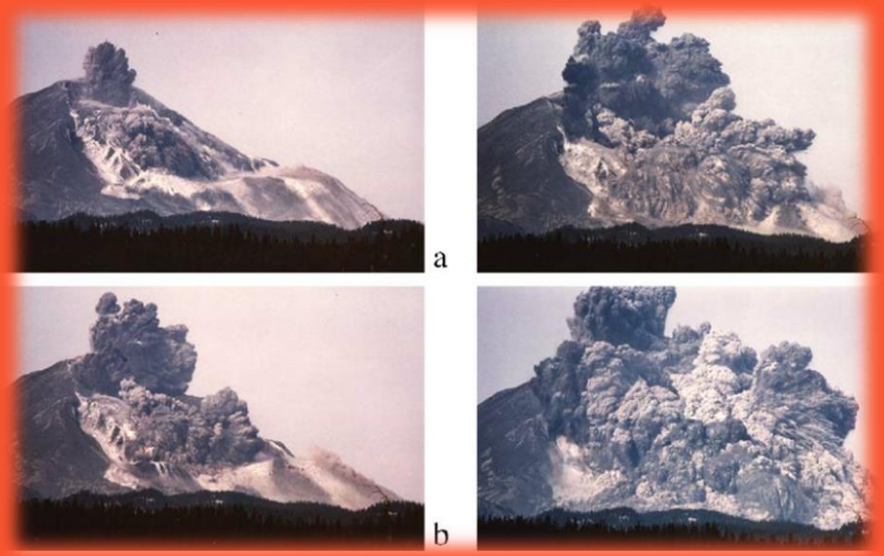
   Examples:
   LAH, nBu-Li, HF, Piranha, etc.
4. ***Mercury Thermometers***
   - Labeled separate puncture resistant container

   
5. ***Any uranium, thorium or mercury containing compounds***
   - Contact Ken Greaves and Mike Dymarski

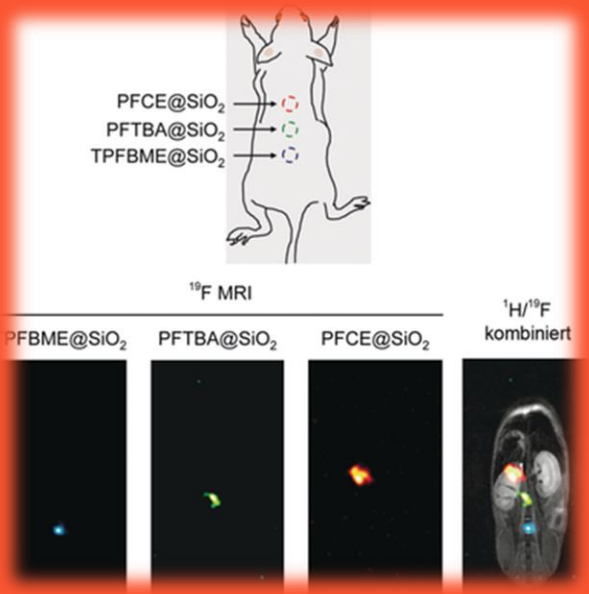
This document was created by Green Chemistry Initiative (GCI) in partnership with Environmental Health and Safety (EHS).

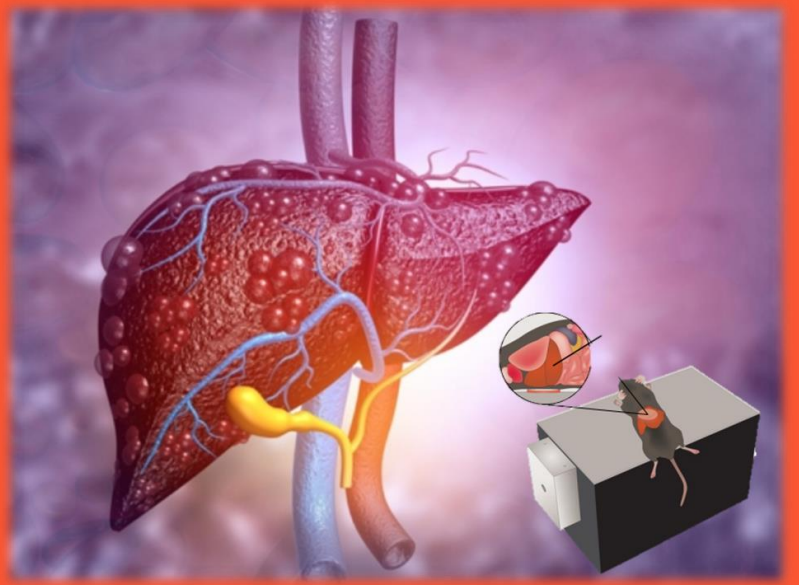
NMR

Analyzing volcanic crater contents



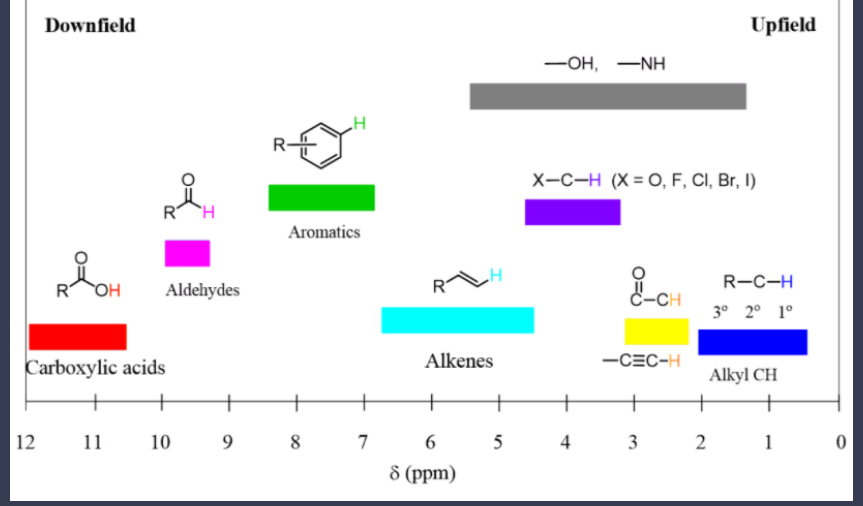
Detecting liver failure

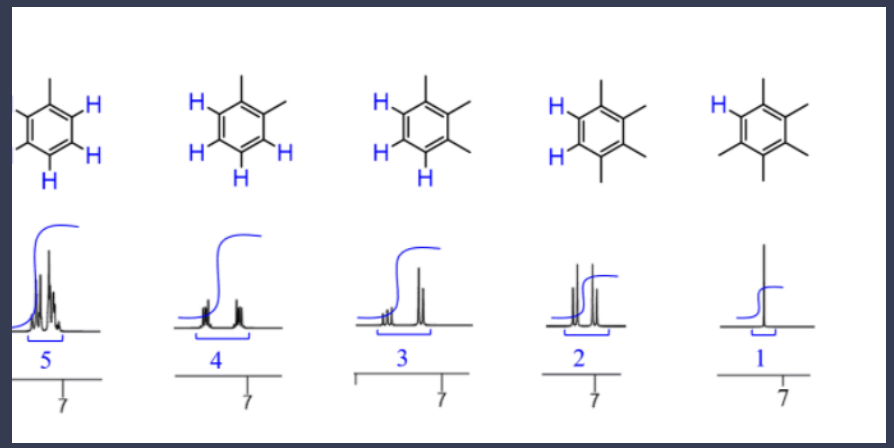


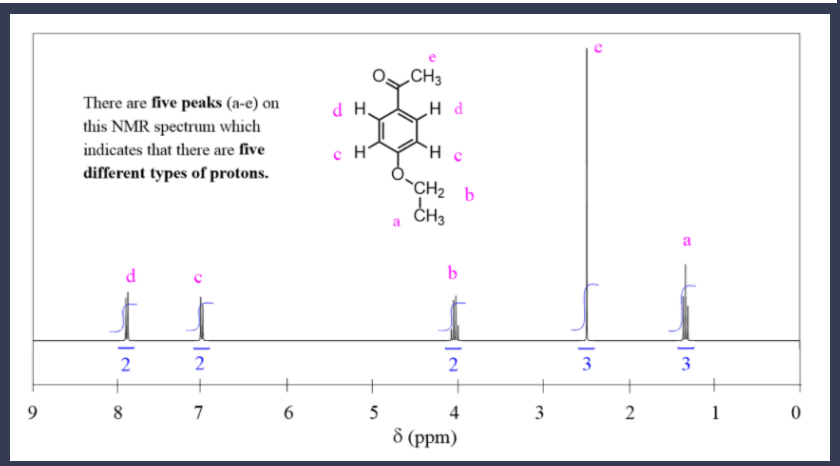


Analyzing ^{1}H-NMR spectra

- Chemical Shifts
- Splitting
- Integration

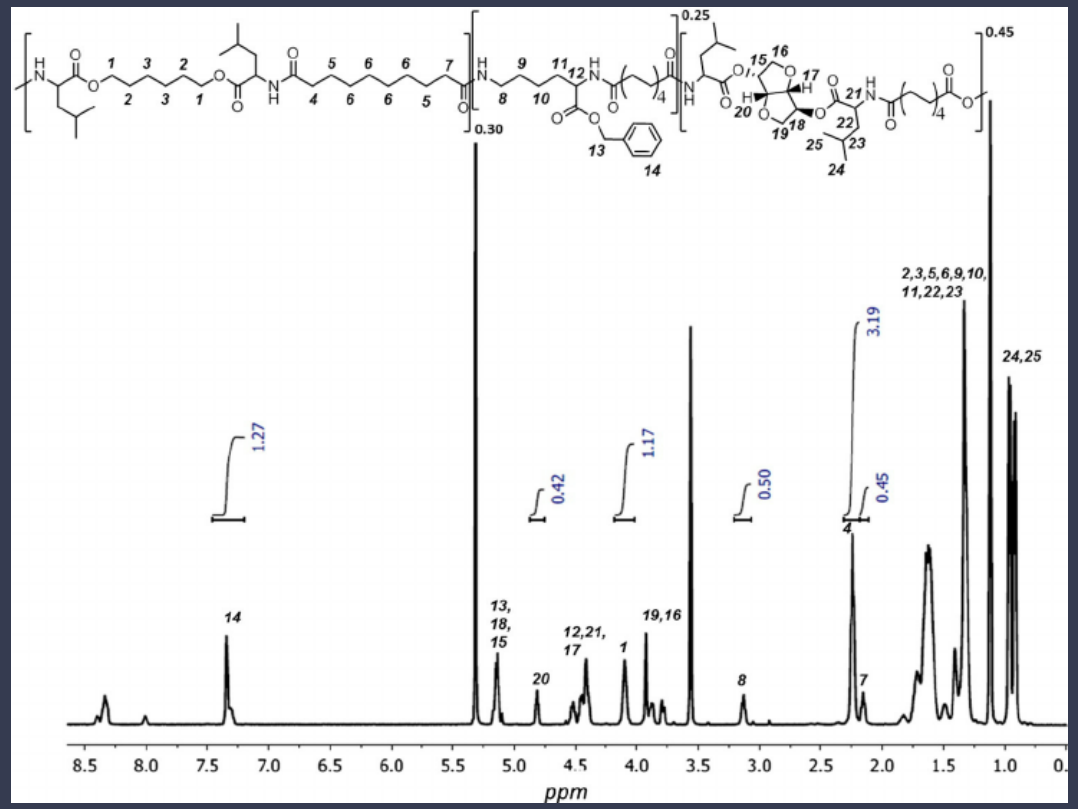




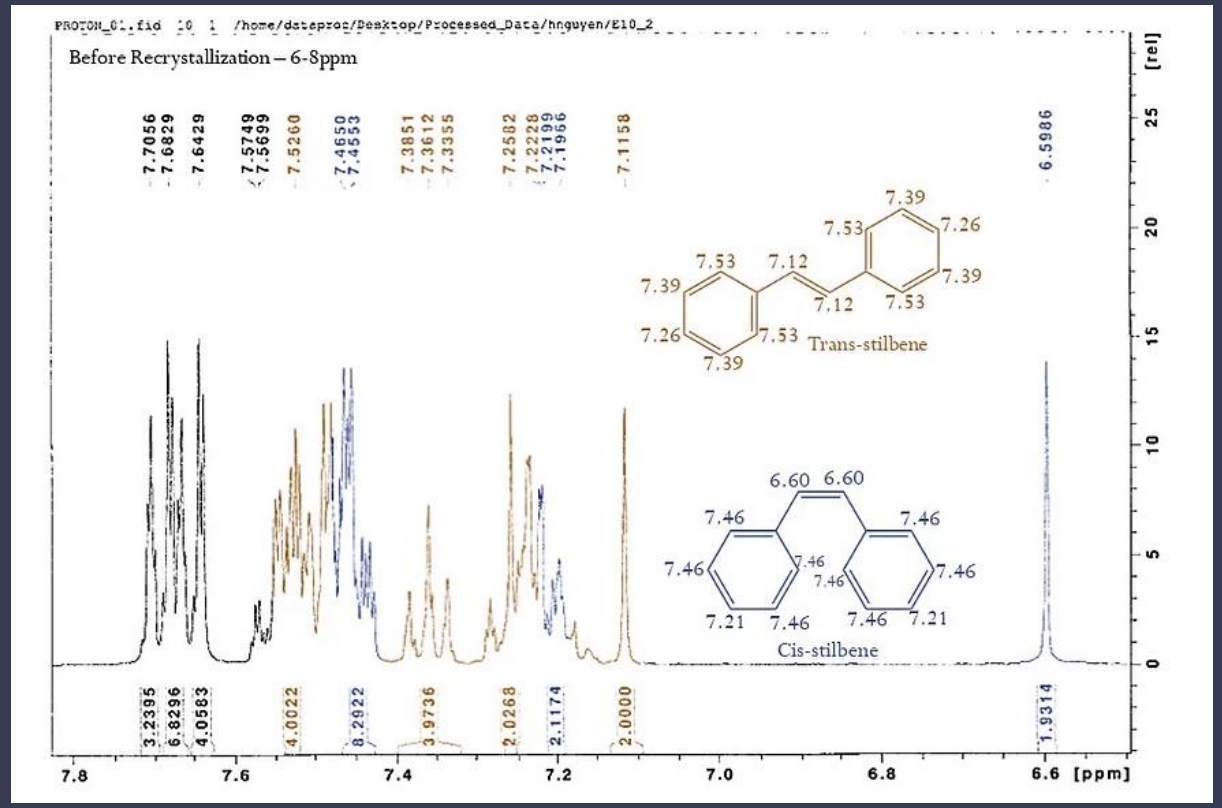


What do NMR spectra look like in real research?

Regional structure

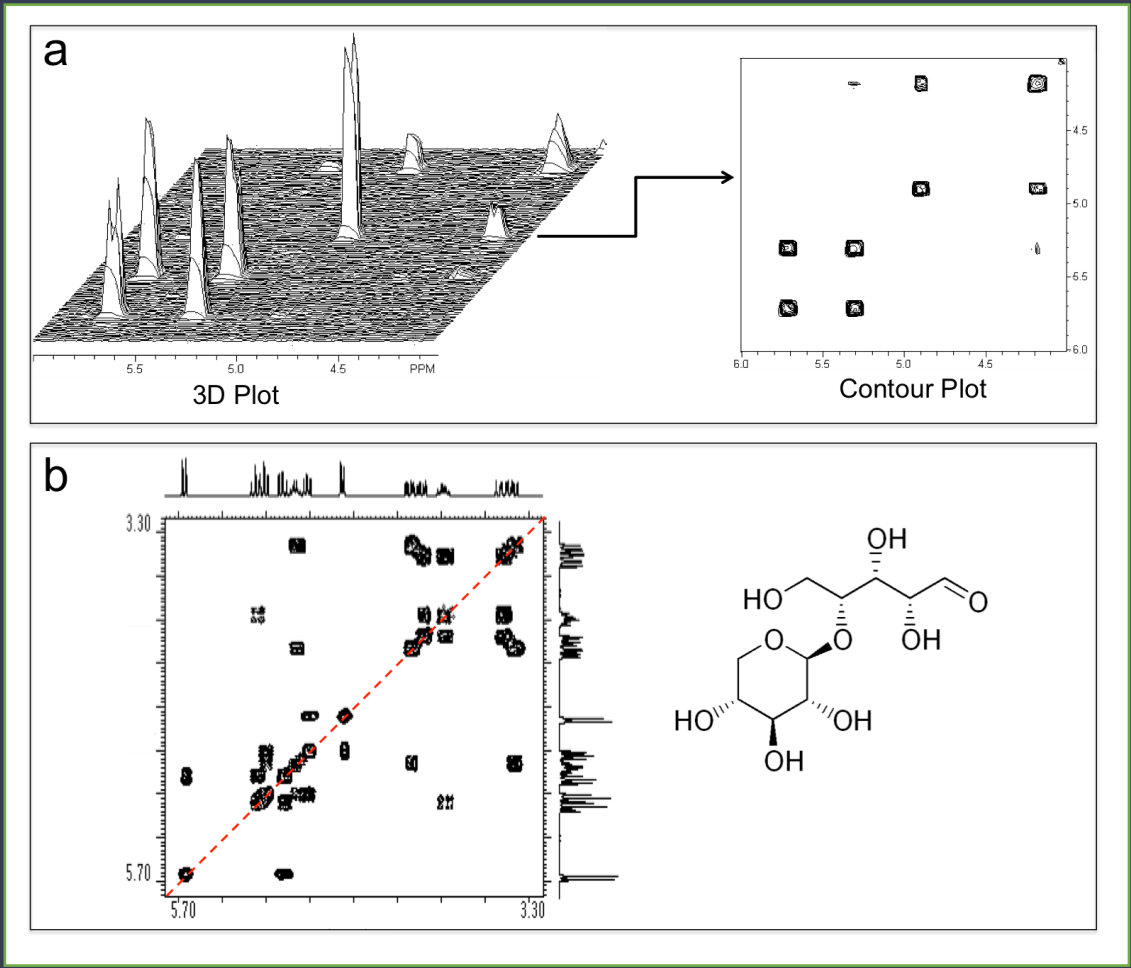


Ratio

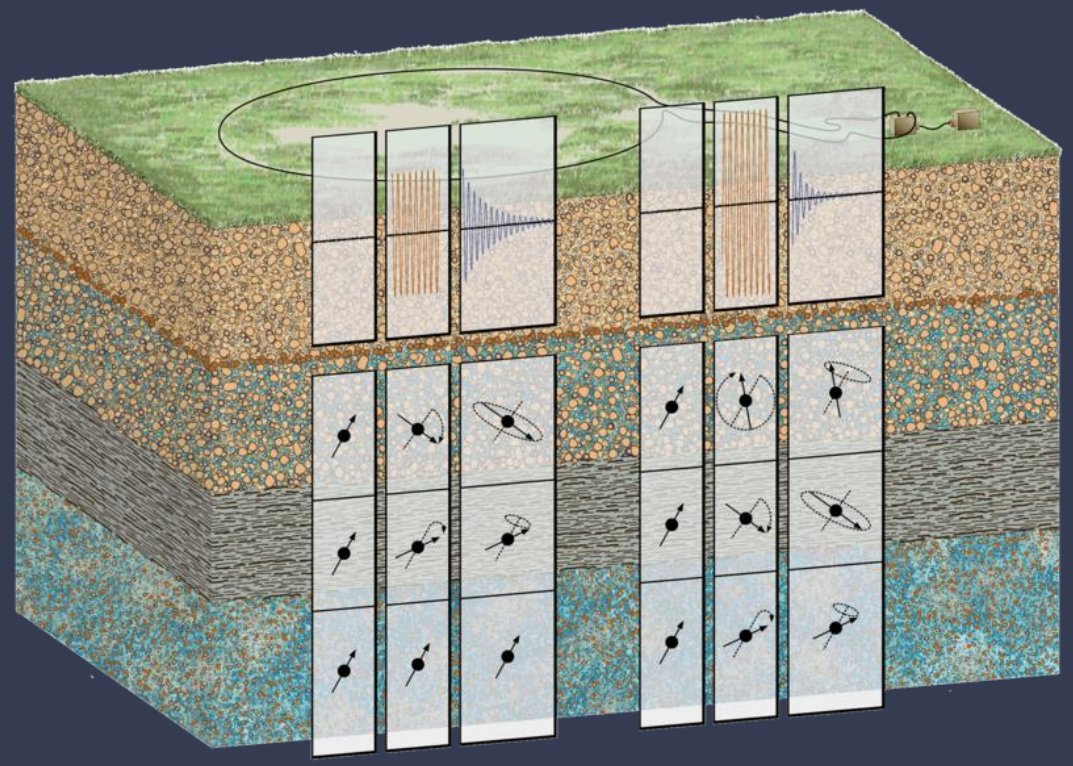


What do NMR spectra look like in real research?

COSY – 2D NMR



Magnetic Resonance Sounding



Reading list:

Using NMR to detect liver failure	https://news.mit.edu/2020/fatty-liver-tissue-sensor-1130
Surface NMR for volcano studies	https://pubs.er.usgs.gov/publication/70156135
2 dimensional NMR (COSY)	https://en.wikipedia.org/wiki/Two-dimensional_nuclear_magnetic_resonance_spectroscopy