

Collaboration in Laboratory Safety

**Ellen Sweet, MS, CCHO
Cornell University
March, 2019**



Cornell University
Environmental Health and Safety



Background

This is a case study of the safety review for a current research proposal in the College of Human Ecology, department of Fabric Design at Cornell.

Incoming!

*Oh what to do when a researcher
proposes chemistry beyond the norm
for their area of science...*

Research Direction

Introduction

Margaret Frey currently works at the Department of Fiber Science and Apparel Design, Cornell University. Margaret does research in Materials Chemistry, Nanotechnology and Polymer Chemistry. Their most recent publication is 'The Degradation of Cellulose by Radio Frequency Plasma'.

Skills and Expertise

Fluorescence

Nanocomposites

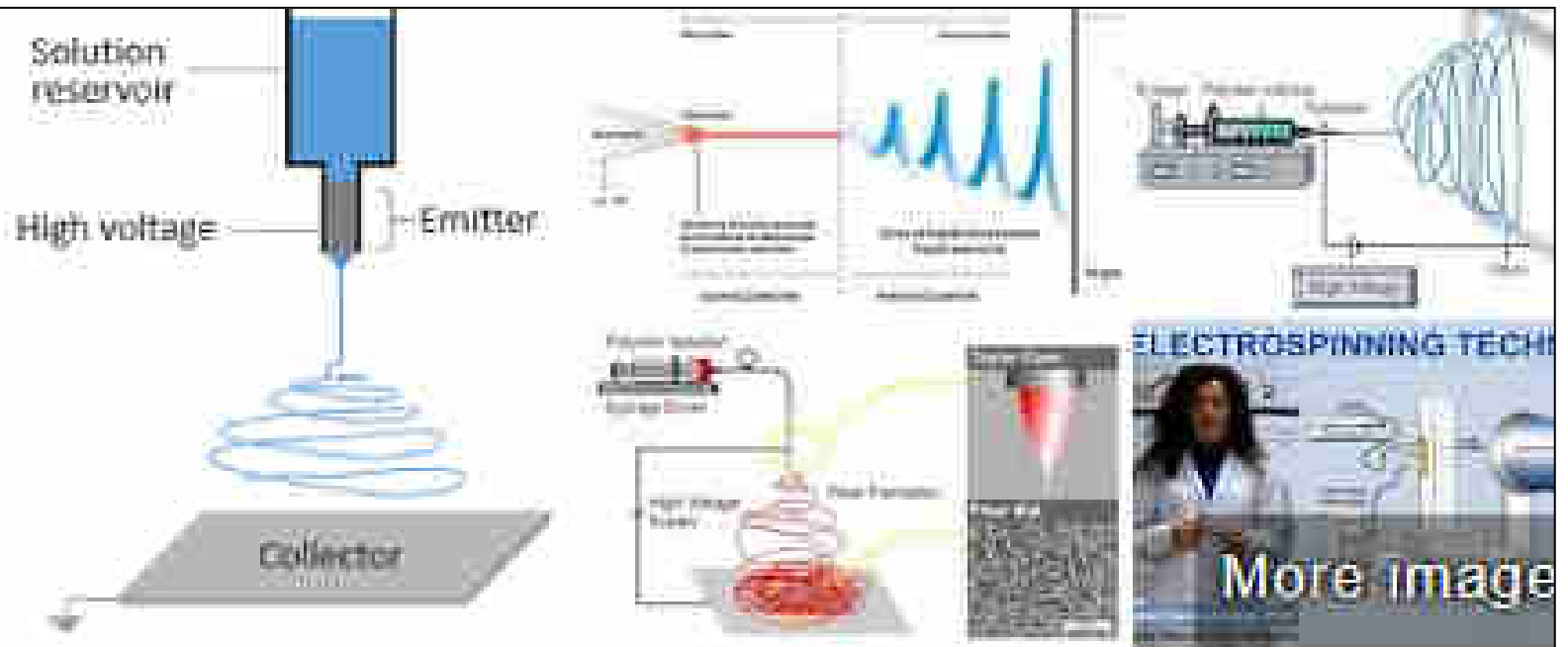
Nanofibers

Electrospinning

Polymers & Microfluidics

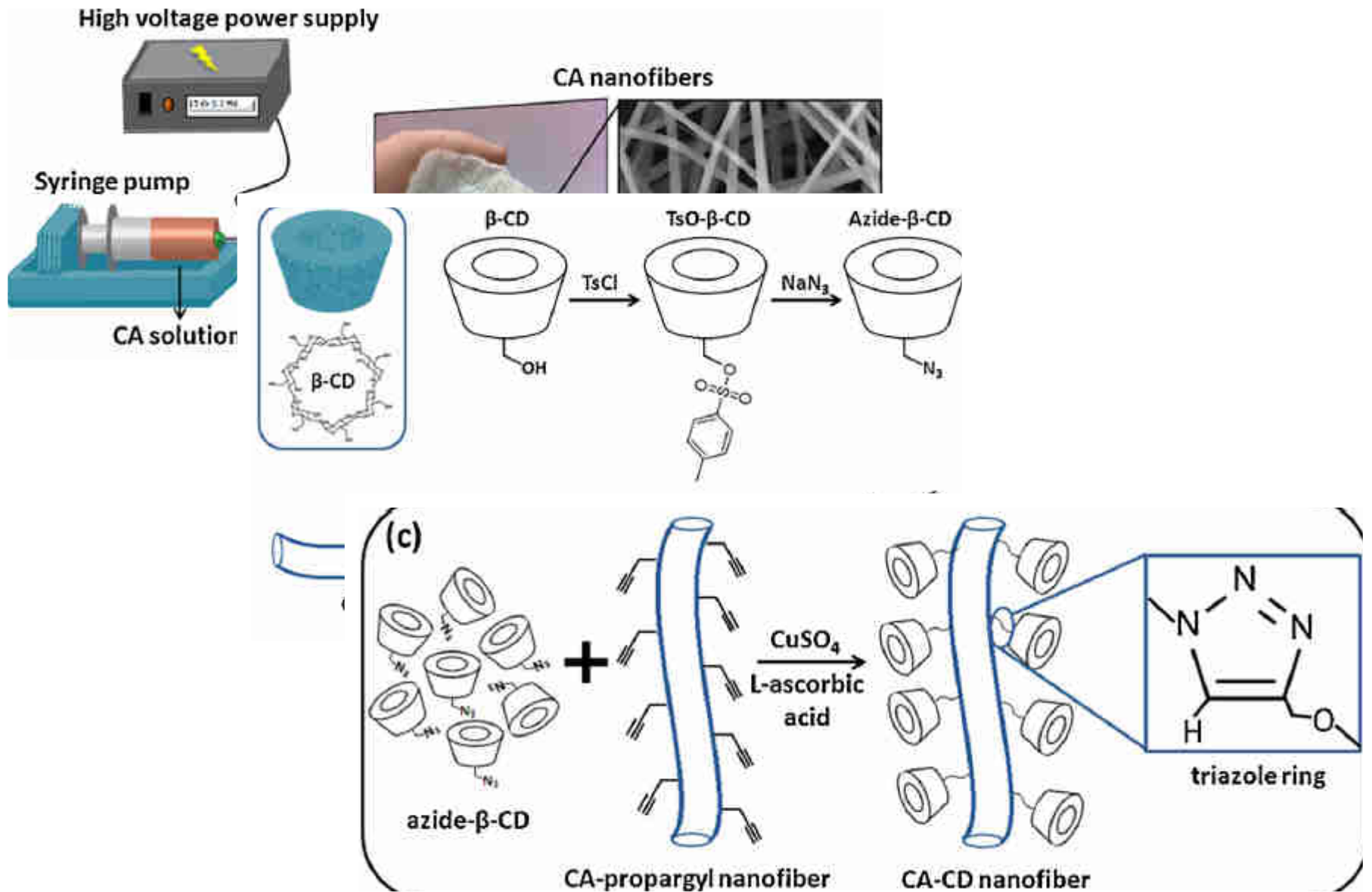
Gels

[Show All](#)



Electrospinning

Electrospinning is a fiber production method which uses electric force to draw charged threads of polymer solutions or polymer melts up to fiber diameters in the order of some hundred nanometers. Electrospinning shares characteristics of both electrospaying and conventional solution dry spinning of fibers. [Wikipedia](#)



Nanoscience is Everywhere

- Literature search for the direction of the research proposal
- Unfamiliar hazards
 - Fiber Science working with **sodium hydride** in electrospinning and grafting an azide onto nanofibers
- Contact EHS about how to handle the hydride!




When to Bring in the Big Guns

The screenshot shows the PMC interface for an author manuscript. At the top, there is a search bar with 'PMC' selected and a search button. Below the search bar, the text 'US National Library of Medicine National Institutes of Health' is visible. The page title is 'Journal List > HHS Author Manuscripts > PMC3286627'. A prominent banner for 'HHS Public Access' is displayed, indicating the manuscript is 'Peer-reviewed and accepted for publication'. Below this, there are links for 'About author manuscripts' and 'Submit a manuscript'. The main content area includes the journal title 'J Org Chem', the publication date '2012 Feb 26', and the PMID 'PMC3286627'. It also lists the original publication 'J Org Chem. 2009 Mar 20; 74(6): 2567-2570.' with a DOI of '10.1021/jo802706d'. The article title is 'Complications from Dual Roles of Sodium Hydride as a Base and as a Reducing Agent', and the authors are 'Dusan Heseck, Mijoon Lee, Bruce C. Noll, Jed F. Fisher, and Shahriar Mobashery*'. A yellow box at the bottom states: 'The publisher's final edited version of this article is available at J Org Chem. See other articles in PMC that cite the published article.'

PMC
US National Library of Medicine
National Institutes of Health

Advanced Journal list

Journal List > HHS Author Manuscripts > PMC3286627

 **HHS Public Access**
Author manuscript
Peer-reviewed and accepted for publication

About author manuscripts Submit a manuscript

[J Org Chem](#). Author manuscript; available in PMC 2012 Feb 26. PMID: PMC3286627
Published in final edited form as: NIHMSID: NIHMS95811
[J Org Chem](#). 2009 Mar 20; 74(6): 2567-2570. PMID: 19215116
doi: [10.1021/jo802706d](https://doi.org/10.1021/jo802706d)

Author Manuscript

Complications from Dual Roles of Sodium Hydride as a Base and as a Reducing Agent

[Dusan Heseck](#), [Mijoon Lee](#), [Bruce C. Noll](#), [Jed F. Fisher](#), and [Shahriar Mobashery](#)*

▶ Author information ▶ Copyright and License information [Disclaimer](#)

The publisher's final edited version of this article is available at [J Org Chem](#)
See other articles in PMC that [cite](#) the published article.

Sodium Hydride
(Hydrogen)
usually as

...
sho
'Dro

...eases flammable ga
...y chemical supplier
...dispersion is safer t

Informing In-Depth Discussion

- Job Hazard Analysis (JHA)
 - This aids in the development of a standard operating procedure
- Have templates- JHA, SOP
 - Homework for the researcher
 - Guide conversations
- Preoperational Safety Review
 - What questions to ask?

“Unpacking” the Procedure Steps

- Wash the hydride of the mineral oil with tetrahydrofuran add isopropanol
- Affix the round bottom to a clamp over an ice bath
- Add nanofiber, cellulose acetate, and propargyl bromide
- When finished remove fiber
- Quench hydride



...fast forward 6 months...

Literature searches- Discovered relevant publications for the research application and safety information (Organic Synthesis, UCLA SOP on sodium hydride)

JHA identified the **lack of understanding** of the chemistry on the part of the researcher(s)

Total Redirection



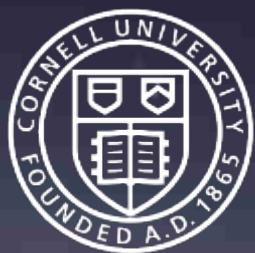
This is Not Home Economics!

- College of Human Ecology
 - Human Development
 - Design and Environmental Analysis
 - Nutritional Sciences
 - Policy Analysis and Management
 - Health Administration
 - Fiber Science and Apparel Design
- Safety Committee

Re-Assess

- Totally enclosed laboratory procedure
 - nitrogen
- Pre-work enclosed in inert atmosphere
- HazWaste quenched
- Emergency response protocols in case of flare up (sand bucket)

Job Hazard Analysis			
Job Location:	HEB 155	Laboratory Group:	Frey Date:
Activity or Job			
Completed By			
Equipment and Chemicals Required	Materials- 2ml septum vials (6), 0.5 ml 1% solution of NaH in THF, septum tops, syringe needle for nitrogen, PPE, propargyl bromide, fabric, freezer bag of ice, sand bucket		
Work Steps and Tasks <i>Describe the tasks / steps involved in the work – in order</i>	Hazards Identified for each Task / Step	Risk Level <i>Risk Nomogram can be used</i>	Control / Safe Work Procedures for each Task / Step <i>Controls to be implemented</i>
Location- glovebox N ₂ (g) cylinder located next to hood. Through antechamber,	Contamination of glovebox with air	low	Training on the proper use of a glovebox and



Questions?

