Collaboration in Laboratory Safety

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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 electrospraying 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

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

Dusan Hesek, Mijoon Lee, Bruce C. Noll, Jed F. Fisher, and Shahriar Mobashery

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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 and 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)
Questions?