

IPRO 348

Silver Nanorods as Indicators of Thermal History

- Presenters:

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Problem Statement

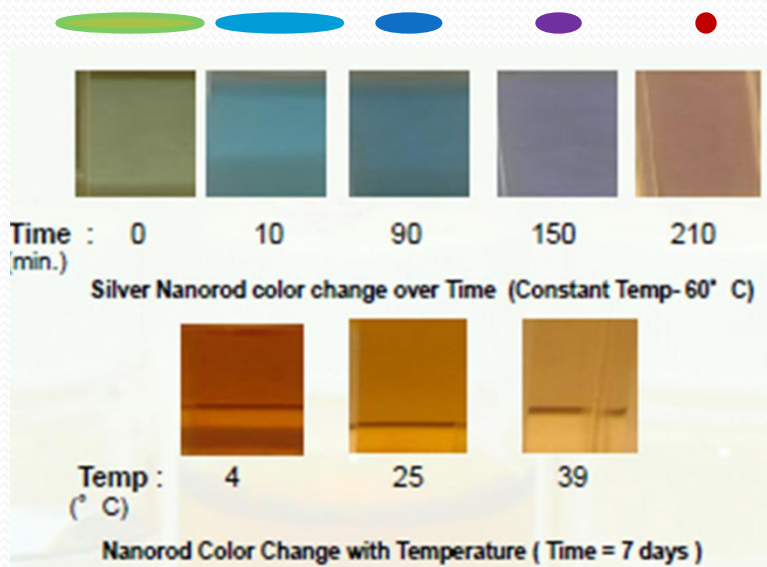
There are many perishable products requiring stringent, low temperature storage conditions

- Food born illness
 - Power outage, NYC, 2003*
 - Hundreds children hospitalized from spoiled milk, 2004**
- **Protecting Consumers**
 - **Label Indicators**

References: *Cnn.com, Monday, Aug 18th, “Spoiled food behind NYC illness”.

**“Hundreds of children hospitalized in Ukraine’s Capital”, AP World stream, March 21, 2004,

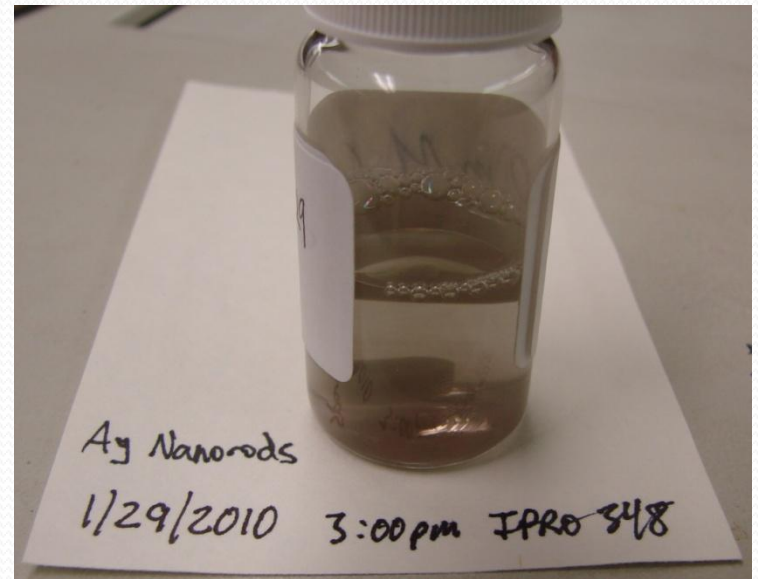
Why Silver Nanorods?



- Nanorods
 - Small particles, with a physical shape that changes with time and temperature
- Spring 2009 IPRO
 - Ideal volume
 - More economic
 - No control of color change
- Nanorods look promising!

IPRO Goals

- Create silver nanorods
- Evaluate risks
- Create a prototype
- Technologies and applications
- Process design and scale-up
- Chemical engineering design



Silver nanorod solution created in the lab

Team Organization

Lab

Experimentation
and analysis

Prototype

Design a
thermal
indicator

Research

Investigate and
evaluate new
applications for
silver nanorods

Scale-
Up

Design a
process for
increased
production

Ethics

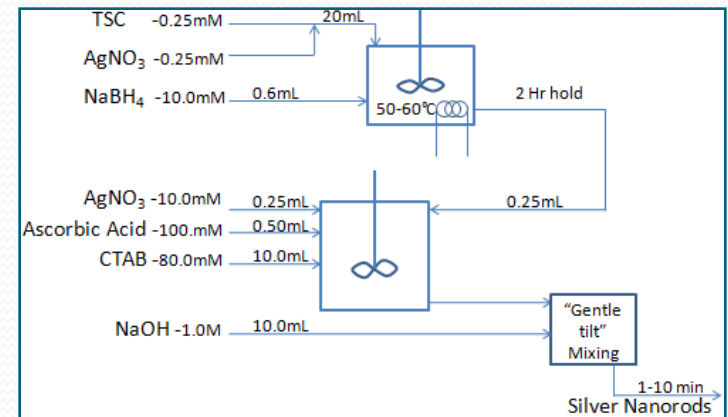
Investigate
ethical issues
surrounding
nanorods

Business

Economic
analysis and
design

Progress Toward Goals

- Lab Team
 - Experimental protocol
 - Experimentation and analysis
- New Technology
 - Thermal indicators
 - Potential for other technologies
- Scale-Up
 - Potential processes for synthesis
 - Process flow diagram
- Ethics Team and Business Group
 - Health, safety and environmental issues



Early process flow diagram design

Major Obstacles Encountered

- Limited experimental data from the lab
- Published protocols incomplete
- Varying lab conditions
- Team logistics and communication
- New technology
- Packaging

Anticipated Major Challenges

- Consistency with the lab products
- Reluctance of companies to share information
- Difficulty in integrating new technology into society

Needs, Questions/Requests

- From professors and experts
- Researchers in nanotechnology field
- Input from other fields
- IPRO funding
- Business expertise



Questions?