



Project on Emerging Nanotechnologies

Green Nanotechnology I What is it?

Barbara Karn, Woodrow Wilson International Center
for Scholars/US EPA

John Warner, University of Massachusetts, Lowell

Jim Hutchison, University of Oregon

Washington, DC

February 16, 2006

Schedule for Green Nanotechnology events at Wilson Center

Green Nano I --What Is It? (Thurs. February 16, 2006)

A discussion of how what we already know can be applied to a new technology--Green chemistry, Green Engineering, Environmentally Benign Manufacturing, Eco-efficiency, industrial ecology, etc. How would green nanotechnology change our approach to this new technology?

Speakers: Jim Hutchison, University of Oregon
 John Warner, University of Massachusetts--Lowell

Green Nano II --Industrial Perspectives. (Wed. April 19, 2006)

How does industry perceives its role in preventing environmental harm from new technologies; how can industry educate itself in preventive measures? What are the economics of being green? etc.

Green Nano III --Policy Options For Greening New Technologies. (Wed. May 22, 2006)

Are regulations necessary? Are there barriers to being green? What incentives might work? Who cares about green?



Nanotechnology and the Environment

A symposium sponsored by the Division of Industrial and
Engineering Chemistry



At the 231st American Chemical Society National Meeting
Atlanta, Georgia March 26-30, 2006

The objectives of this symposium are to highlight the latest research results in nanotechnology that address pollution prevention at its source through greener synthesis of nanomaterials and products and use of nanotechnology to reduce pollutants in current processes

Session topics:

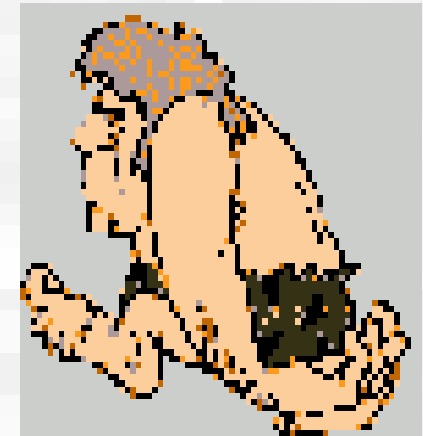
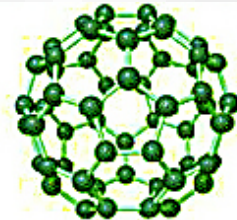
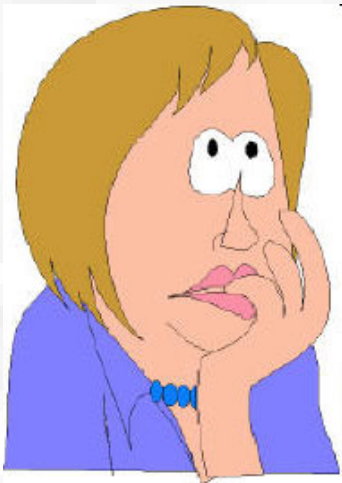
- Overview of nanotechnology programs and issues
- Environmentally benign synthesis of nanomaterials
- Bio-inspired nanotechnology
- Use of nanotechnology leading to cleaner production
- Nanotechnology for environmental clean-up
- Nanomaterials for use in energy applications
- Nanotechnology related to the hydrogen economy

Co-Chairs: Barbara Karn, U.S.EPA; James E. Hutchison, University of Oregon
Florian Schattenmann, General Electric; Nora Savage, U.S.EPA

Evolution

Is it harmful? Can it be made without pollution?
How will it affect society? Do we have an adequate
Infrastructure to handle it? Can we use it to clean up
the environment? What are the risks? Is it green?

Stone Age to Copper

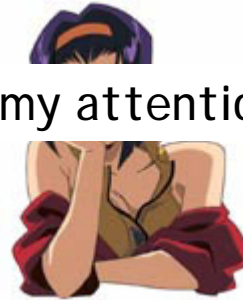


20th Century Technologies to Nanotechnologies



Newsworthy

Got my attention!



Help for my hangover



Boring

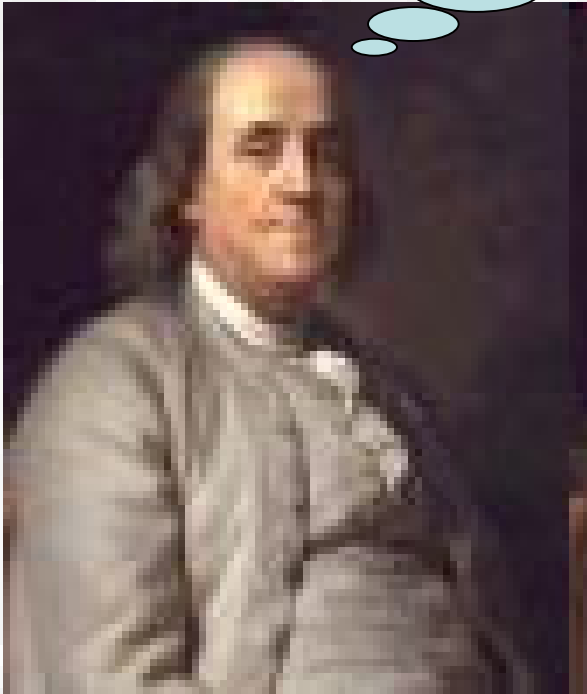


Maybe next month



No comment

An ounce of prevention
is worth a pound of cure



Ben Franklin born Jan. 17, 1706

In other words:

A little precaution before a crisis occurs
is preferable to a lot of fixing up
afterward.

Green Nanotechnology

offers opportunities for getting a technology right in the first place, i.e., with minimal environmental and human health impacts

- New Green Manufacturing--Atom-by-atom construction--
Less material to dispose of, less waste
Improvement of "Old" Green Manufacturing
Use of renewables
- Proactive Information for Environmental Protection/Risk Management--
More efficient use of materials, more data on wastes
 - Dematerialization- less "stuff" to begin with, save natural resources
- New Sensors for Industry Controls, Ecosystem Monitoring
 - Energy Savings--Light Weight, Embedded Systems

PLUS cleanup of the waste from today's and yesterday's industry

Green Nanotechnology Framework

1. Production of nanomaterials and products does not harm the environment

Making NanoX “greenly”

e.g., Green chemistry, Green engineering, DfE, Smart business practices

Using NanoX to “green” production

e.g., Nanomembranes, nanoscaled catalysts

Pollution Prevention Emphasis

2. Products of nano help the environment

Direct Environmental Applications e.g., environmental remediation, sensors

Indirect Environmental Applications e.g., saved energy, reduced waste,

Anticipating full life cycle of nanomaterials and nanoproducts

NEXT STEPS: Policies that offer incentives for developing green nanoproducts and manufacturing techniques