Sonoluminescence

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Acoustic Cavitation:
Growth & Implosive Collapse of Bubbles

Intense Plasma formed inside Collapsing Bubbles

Sonochemistry Rig

Sonoluminescence from Acoustic Cavitation

Mechanism of Sonoluminescence (ML): light produced during mechanical action on a solid

Suslick Group

Sonochemistry & Materials Chemistry
Ultrasonic Spray Pyrolysis, Nanomaterials

Sonoluminescence

Olfaction and Molecular Recognition
The Optoelectronic Nose

www.scs.uiuc.edu/suslick

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Olfaction & the Optoelectronic Nose

Jon Askim, Minseok Jang, Wei Jiang, Jonathan Kemling, Hengwei Lin

New Synthetic Methods for Nanomaterials

Maria Fortunato, Brandon Ito, Howard Kim, John Overcash, Maryam Sayyah
Suslick Group Overview
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Sonoluminescence


Chemical Sensing

I. Sensors and Chemical Sensing
   Mechanisms of Molecular Recognition
   Chemical Sensing & Chemical Sensors: “Smell-Seeing”
   Biophysics of Smell and Taste

II. Chemical Effects of Ultrasound
   Sonoluminescence and Spectroscopy
   Synthetic Applications of Sonochemistry
   Nano-Materials and Catalytic Applications

FRENFAQs™

Frequently Not-Asked Questions: Educational Philosophy

• Undergraduate education is the learning of that which is already known:
  Graduate education is the learning of that which no one knows.

• Graduate education is learning how to do what we call research: i.e.,
  Graduate education is learning how to learn the unknown.

• I expect my students to become independent researchers:
  I cannot do that if I treat you like a technician!
Criteria: The very best research permanently changes the way people think about some field of knowledge. If the goal of a project doesn’t ultimately come up to that standard, the result will be boring.

Pure vs. Applied: Pointless distinction. More important: Is it interesting or boring?

Interdisciplinary and Multidisciplinary: Both between areas of chemistry and including elements from multiple fields of science.

Chemistry: 1900

- Analytical
- Inorganic
- Physical
- Organic
"Forward, in all directions!" – Leon Trotsky
The Nano-Scale Gap

Living
- Pharmacology
- Biochemistry
- BioPhysical
- Polymeric Materials
- Inorganic Materials
- Materials Engineering; Solid State Physics

Non-Living
- Nuclear Physics
- Organic
- Organometallic
- Physical
- Inorganic

Chem-Space
- Small
- Large
- 1 amu 10 10^2 10^3 10^4 10^5 10^6 10^7
- 100 1000

Research in the Suslick Group

Living
- Protein Microspheres

Small
- Chemical Sensing
- Nanoporous Pigments: Sol-Gel Sensors
- Sonochemical Synthesis of Nanostructured Materials

Non-Living
- Sono-luminescence

Nuclear Physics
- Physical
- Inorganic