



# NEWSLETTER

Oklahoma Section

American Chemical Society

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## Layer-by-Layer Nanoengineered Magnetic Encapsulation System for Drug Delivery

Monday - April 23, 2007

Heritage Center - Room 326

Nigh University Center

University of Central Oklahoma

Edmond OK 73034

**Dr. Malcolm D. Prouty**

Institute for Micromanufacturing

Louisiana Tech

620 North Farmerville Street # 6

Ruston LA 71270-3976

**L**ayer-by-layer [LbL] self-assembly has demonstrated broad perspectives for encapsulating and controllable delivery of drugs. The nano-scale polymer layers have the capability of material protection. Ferromagnetic nanoparticles have great potential to be applied with LbL technology to achieve both "focusing" of the encapsulated drugs to a specific location followed by "switching" them on to release the encapsulated drugs. In this work, Dexamethasone (hydrophobic) was used as a model drug. LbL assembly was applied to encapsulate the drug with biocompatible polyelectrolytes such as protamine sulfate, carboxymethyl cellulose, chondroitin sulfate, and gelatin B. The procedure of layer-by-layer assembly was elaborated. The biocompatible polymers were used to retain and protect the vulnerable drug. In vitro drug release kinetics were investigated according to different environmental factors such as temperature and pH. An external oscillating magnetic field was applied to switch on and accelerate the drug release. The results were compared to those without applying a magnetic field. Figure 1: Confocal images of Co@Au embedded microcapsules along with intensity profiles (a) before applying and (b) after applying an alternating magnetic field.. .....

[Reservation Information on Page 2]

**Schedule:**

5:45-6:45 PM Social Hour: Dr. Robert Bost's House\*\*\*

7:00 PM Dinner: Heritage Room # 326  
Nigh University Center

8:00 PM Speaker: Dr. Malcolm D. Prouty

Menu: Dinner: Mixed Green Salad; Sliced Roast Beef au jus **OR** Almond Chicken Oriental w/Rice; Parsley Red Potatoes; Green Beans; Rolls; Coffee or Tea; Dessert [Pie or Cake].

Cost: \$XX.00-ACS Member; \$5.00-ACS Student Affiliate.

**Reservation Deadline:** Wednesday, 04/18/07; 4:00 p.m. Carla Supon 405.974.5732  
csupon@ucok.edu

\*\*\* Directions To Dr. Robert Bost's House:

Exit on 2<sup>nd</sup> Street [Highway 66]  
Go West about 2.5 miles to UCO campus  
Go South on Rankin Street [Just West of the large building under construction]  
501 Park Place: Corner of Park Place & Rankin  
Cell: 405;664.2386

## Dr. Malcolm D. Prouty

Malcolm Prouty finished his B.S. in electrical engineering at Louisiana Tech University in 2003. During that time he worked as an undergraduate research assistant designing and fabricating polymer microelectronics such as Schottky diodes and metal-oxide-semiconductor (MOS) capacitors. After receiving his B.S. degree, Malcolm continued to study at Louisiana Tech University in order to pursue his doctorate degree. His work is supervised by Dr. Yuri Lvov and involves controlled drug release using layer-by-layer self-assembled microcapsules embedded with ferromagnetic nanoparticles. He has successfully been able to "switch on" the diffusion of macromolecules through a polyelectrolyte shell embedded with ferromagnetic nanoparticles and is currently applying this method to peptide and drug delivery.

## Ethanol And Energy Independence.

You might wish to read the Special Report "Overselling Ethanol", U.S. News & World Report, Feb. 12, 2007. It is factual and well written without any political ethanol hype so common now. It is similar in many respects to the ethanol story some weeks ago in C&E News: Jeff Johnson: "Ethanol – Is It Worth It?" The ethanol "fiasco" is likely best summed up by Johnson's last statement: "What's clear is that corn based feedstock is likely to be the start of a biofuels market, not its end."

A quote from the U.S. World News Report: "Because of its lower energy content, it takes 1.5 gallons of ethanol to drive as far as on 1 gal of gas. *Consumer Reports* calculated E-85 ended up costing motorists ≈ \$1.00/gal extra to buy this motor fuel." This fact is never mentioned in pro E-85 articles!

To paraphrase one of Sir Winston's famous WW II remarks: "Never in the history of American business has so much been done [ethanol production tax credits, etc], by so few [lobbyists] for the benefit of so few corporations [Cargill, ADM]."

## Are Organic Food Advocates in Thrall to Mythology Rather Than Science?

Your article "When Buying Organic Makes Sense – and When It Doesn't" [Personal Journal, Jan.16] was refreshing in its presentation of the quietly held view of many scientists that the touted virtues of organic food are exaggerated or non-existent. But you weren't sufficiently skeptical when you accepted the commonly held belief that organic farmers "eschew pesticides and other chemicals in an effort to protect the environment."

In fact,, organic farmers are free to use many chemicals on their crops, including pyrethrin [with the formula  $C_{21}H_{28}O_3$ ] and rotenone [ $C_{23}H_{22}O_6$ ], which is a potent neurotoxin long used to kill fish and recently linked to Parkinson's disease. Organic farmers also commonly spray their crops with *Bacillus thuringiensis* solutions containing BT larval toxins, and they use sulfur and copper [both long lasting soil contaminants] as fungicides.

Organic certification rules only prohibit most, although not all, "synthetic substances and ingredients". The word "chemical" isn't used in the rules because there is no intrinsic physical difference between the categories or synthetic and non synthetic substances. They are all chemicals.

Nevertheless, organic advocates operate under the pre-scientific delusion that substances produced by living organisms, such as pyrethrin and rotenone, aren't really chemicals, but just organic "botanical" constituents of nature. Even the poison strychnine can be defined as "organic", although it's too lethal for use by organic farmers. In actuality, no currently approved crop pesticide, whether organic or not, has any detectable effect on the health of consumers. The enormous premium paid to purchase organic foods is based on mythology, not fact.

Lee M. Silver  
Professor of Molecular Biology & Public Affairs  
Princeton University  
Princeton, N. J.

[Prof. Silver is author of "Challenging Nature: The Clash of Science and Spirituality at the New Frontiers of Life," Ecco, 2006]

For more information, check Dr. Silver's website with a post of the article -- it has pictures and direct links to sites with more detailed information. <http://www.leemsilver.net/challenging/articles/200701WSJ.htm>

*Dr. Silver's letter first appeared in the 01/29/07 "Journal Exchange" page B6 of the Wall Street Journal. Dr. Silver's letter is reprinted with his permission.*

## Oklahoma Should Not Copy California's Stupidity Tax

EDMOND — Many years ago, I discovered one day that my nearly new chainsaw wouldn't start. No matter what I tried, the motor remained dead, so I took it into the local repair shop. When I picked up my chainsaw, it cost me \$16 to discover I inadvertently had activated the emergency cutoff switch. Laughing, I realized the repair bill represented a tax on my own stupidity.

The cost of my stupidity was only \$16. But a law in California that limits carbon dioxide emissions, the Global Warming Solutions Act of 2006, is likely to be considerably more expensive. As a scientist who has conducted and published climate research in top-rank scientific journals, I'm able to distinguish between weather and climate. So I won't claim the recent record cold temperatures in California prove anything about global warming one way or the other. Of course, others will be unable to match my temperance. In the summer of 2007, the fact that some location in the world experiences record-high temperatures will be trumpeted as conclusive evidence that global warming is real. The anomalously low temperatures of the previous winter will be forgotten.

Besides the lesson that weather and climate shouldn't be confused, there is something else that can be learned from California's present cold spell. What harms people and crops is not heat, but cold. For more than 150 years, it has been documented in the medical literature that human mortality rates are highest in the winter when temperatures are the coldest. If some global warming does occur, most of it will be at night, at winter and at high latitudes. These are all places and times that could benefit from a little warming. Some of the citrus farmers in California's Central Valley might agree with me. They just had a billion dollars worth of fruit destroyed by a devastating frost.

I am at a loss to understand why anyone would regard carbon dioxide as a pollutant. Carbon dioxide, a natural gas produced by human respiration, is a plant nutrient that is beneficial both for people and for the natural environment. It promotes plant growth and reforestation. Faster-growing trees mean lower housing costs for consumers and more habitat for wild species.

Higher agricultural yields from carbon dioxide fertilization will result in lower food prices and will facilitate conservation by limiting the need to convert wild areas to arable land. Are these not good things?

There is also a dirty little secret known to climate scientists, but not most of the public. Modeling studies have shown even if the entire world followed California by reducing carbon dioxide emissions to 1990 levels, the net change in global temperature by the year 2100 would be a cooling of less than half a degree Fahrenheit. While California stupidly shoots itself in the foot, China and India happily are growing their economies with unrestricted carbon emissions.

Their populations will prosper, while California's economy slowly will be strangled by politicians pandering to ignorance and irrational hysteria. California residents can look forward to lost jobs, lower wages and higher energy costs — all for no benefit whatsoever.

I have yet to see a person harmed in any way by global warming, Bigfoot or the Loch Ness monster.

Having demonstrated leadership on climate issues by promoting the freezing of orchards, perhaps the next step by California's government will be to regulate alien abductions, ghosts or other invisible and irreproducible phenomena.

Let's just hope Oklahoma politicians don't enact a stupidity tax here at home.

David Deming

[David Deming is a geophysicist, an adjunct scholar with the Oklahoma Council of Public Affairs and associate professor of arts and sciences at the University of Oklahoma.]

*This article was first published in The Edmond Sun on January 25, 2007. It is reprinted by permission of David Deming.*

## Hybrid Tax Credit

Are you concerned about possible climate change? Would you like to help the environment, save gas and leave a smaller carbon footprint from your daily activities? Consider buying a hybrid vehicle

You'll have the financial assistance of your fellow taxpayers if you make this purchase.

Hybrid vehicles, such as the Escape Hybrid, that were purchased or placed into service after Dec. 31, 2005 may be eligible for the Alternative Motor Vehicle Credit. Some information you might need before filing your 2006 tax return.

- You may claim a Federal tax credit of \$2,600 for a 2WD Escape Hybrid model and a credit of \$1,950 for a 4WD Escape Hybrid. The exact amount of your credit is based on when your vehicle was purchased. Amounts may vary.
- The credit is offered for a limited time. After Ford sells 60,000 hybrids, the amount of the credit that owners may claim will be reduced on a quarterly basis.
- Other tax credits, such as adoption or education-related credits must be taken first.
- Additional incentives may be offered by state and local governments. Colorado, for example, offers a credit of up to \$4,437 to resident hybrid owners.
- More information: [www.fueleconomy.gov](http://www.fueleconomy.gov)

The federal government has increased the amount of tax credits available to customers who buy a 2008 Mariner Hybrid. Also, because the Mariner Hybrid is now available in front-wheel drive [FWD], customers qualify for credit of up to \$3,000.

Mariner Hybrid 4WD	2007 tax credits = \$1950	2008 tax credits = \$2,200
Mariner Hybrid 4WD		2008 tax credits = \$3,000

## A Recent Ad in A National News Magazine

Venta Airwasher: Humidifier & Purifier Two in one  
Perfected with the newest cold water evaporation technology.  
The “Wunderding” is so simple – so efficient.

7 Outstanding benefits

# 6. Invisible humidification by cold evaporation, recognized as the best possible technique.

## Future 2007 Meeting Dates/Locations:

May 15, 2007	TBA	Local Speaker
September 15 or 22, 2007	OBU	Sherry Marshall
October 8, 2007	SEOSU	Eugene Stevens
November xx, 2007	OSU	Oklahoma Chemist of the Year Award

**April 2007 Section Meeting**

**Monday 23 April, 2007**

**Heritage Room # 326  
Nigh University Center  
University of Central Oklahoma  
Edmond OK 73034**

**Speaker: Dr. Malcolm D. Prouty – Louisiana Tech**

*Layer-by-Layer Nanoengineered Magnetic Encapsulation  
System for Drug Delivery.*



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