42 Years in 42 Minutes

(more or less)

Carl Wamser

September 28, 2012

New York World's Fair

1939

Jelenko Laboratory

1940

1946 ?

J. Amer. Chem. Soc., 70, 1209-1215 (1948)

[Contribution from the Laboratory of C. A. Wamser]

Hydrolysis of Fluoboric Acid in Aqueous Solution

By Christian A. Wamser

Aqueous fluoboric acid, which is now commercially available in the form of a 40% concentrate, is prepared[1] by treating aqueous hydrofluoric acid with the calculated amount of boric acid according to the equation

$$4HF + H_3BO_3 = HBF_4 + 3H_2O$$

It has been well known that aqueous solutions of fluoboric acid are more or less strongly hydrolyzed depending on the dilution, temperature and length of time they have been standing after preparation. Such solutions always contain more H ion than can be accounted for by the fluoboric acid they are calculated to contain.

Any successful explanation of the net changes occurring on hydrolysis must be capable of accounting for the following experimentally observable facts:

(1) When four moles of hydrofluoric acid and one mole of boric acid are mixed in aqueous medium, an immediate sharp increase in conductance occurs and heat is evolved, yet the solution contains no fluoboric acid immediately after the preparation (no precipitate with nitron). The total titratable acidity (as measured by the volume of standard alkali consumed to the phenolphthalein end-point in the presence of mannitol) of such a mixture immediately after preparation corresponds to five equivalents of acid, the solution at the end-point containing only F^- and BO_2^- anions.

(2) After preparation, the fluoboric acid content gradually increases to a final (equilibrium) value, while the total acidity decreases to a definite value. The only anions present at the titration end-point are BF_4^-, F^- and BO_2^-.

(3) When a fluoboric acid concentrate (which is itself appreciably hydrolyzed) is diluted with water, the total acidity gradually increases to a final (equilibrium) value.

(1) F. Fischer and K. Thiele, *Z. anorg. Chem.*, **67**, 304 (1910).

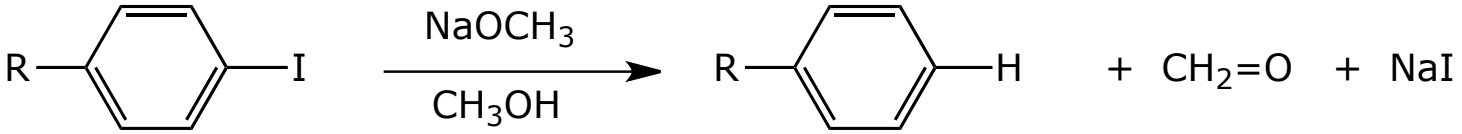
1948

1978

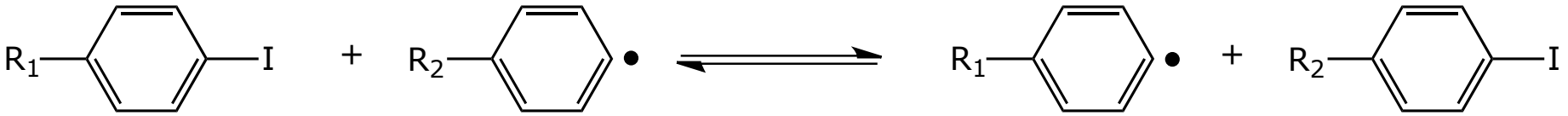
Brown University
Sc.B. 1966

Senior Honors Thesis

Joseph F. Bunnett



(free radical chain mechanism)



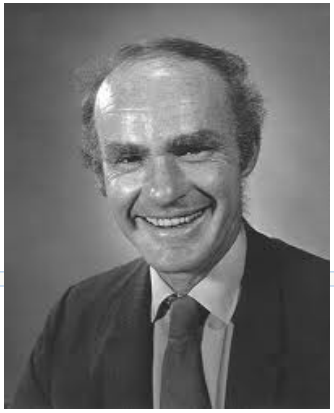
(aryl radical iodine exchange)

- **Radical Abstraction of Iodine from Aryl Iodides**,
  J. F. Bunnett and C. C. Wamser, *J. Amer. Chem. Soc.* **1966**, 88, 5534-7.
- **Radical-Induced Deiodination of Aryl Iodides in Alkaline Methanol**,
  J. F. Bunnett and C. C. Wamser, *J. Amer. Chem. Soc.* **1967**, 89, 6712-8.

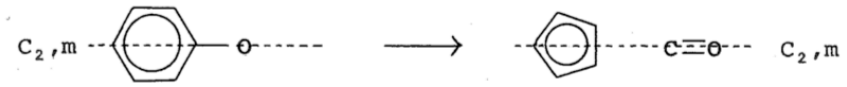
1962-66

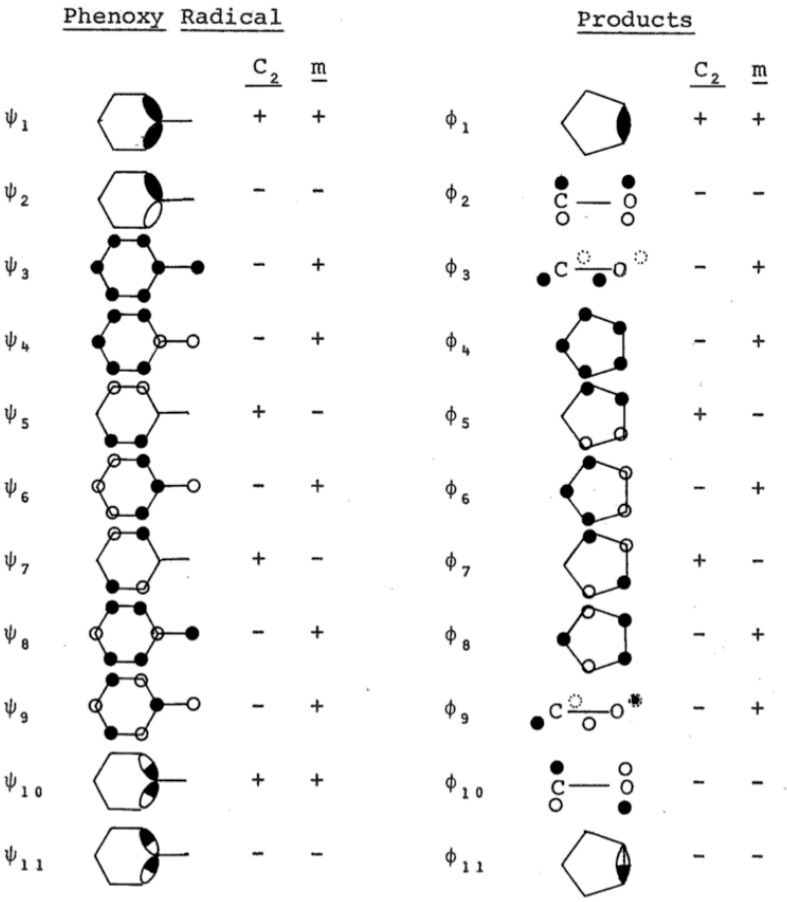
Caltech Ph.D. 1970

Caltech



George S. Hammond



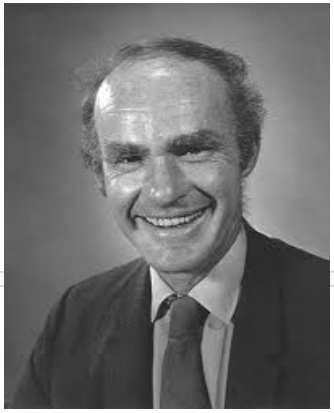


Thesis Project 1

1966-69

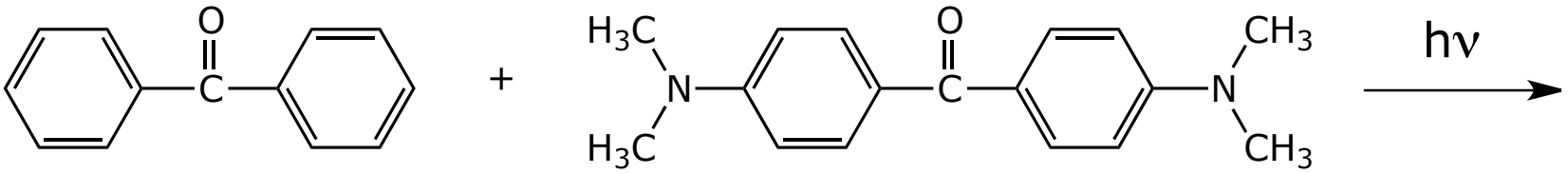
Caltech Ph.D. 1970

Caltech



George S. Hammond

Thesis Project 2

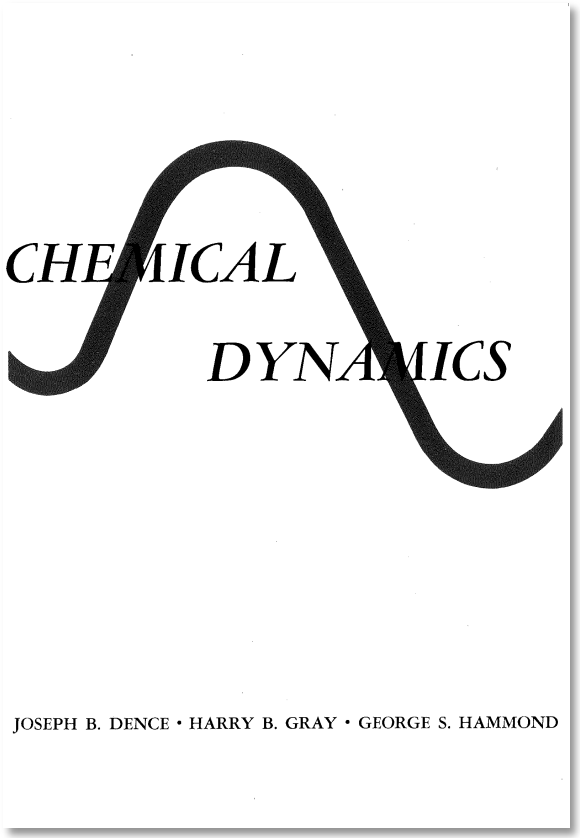


- **The Photoreaction of Michler's Ketone with Benzophenone - A Triplet Exciplex**, C. C. Wamser, G. S. Hammond, C. T. Chang, and C. Baylor, Jr., *J. Amer. Chem. Soc.* **1970**, 92, 6362-3.

1966-69

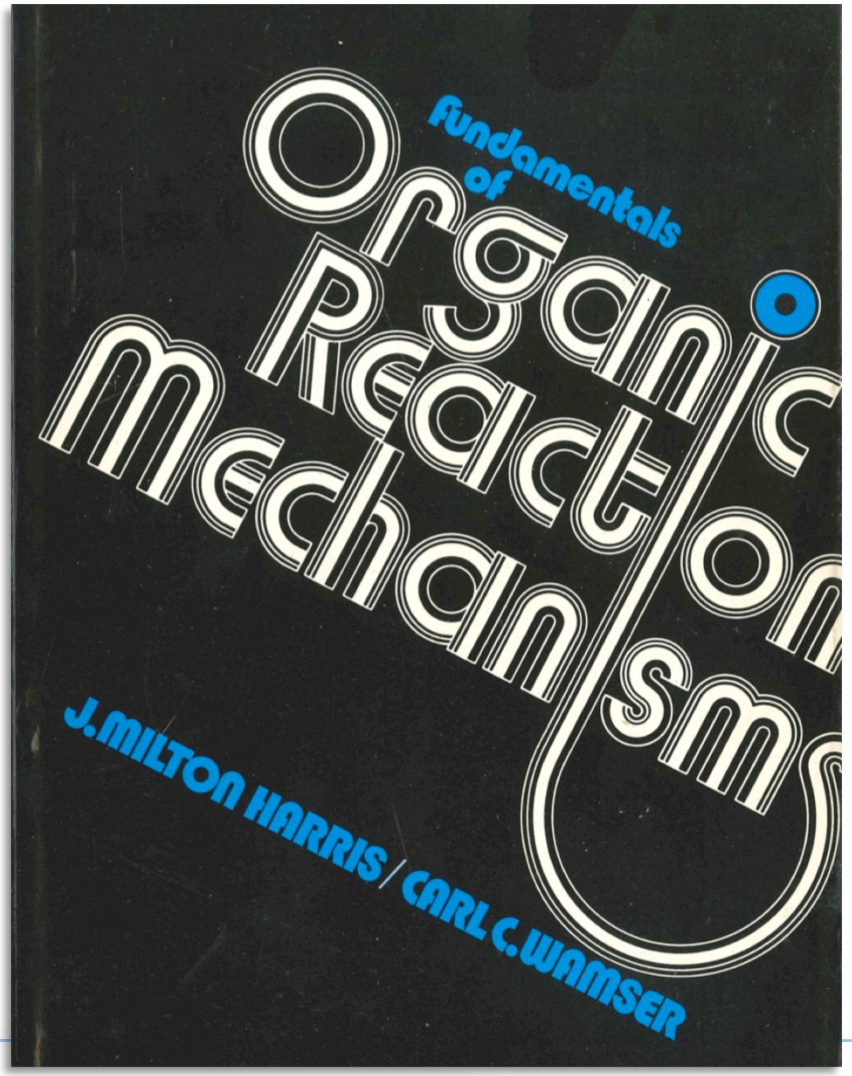
Caltech

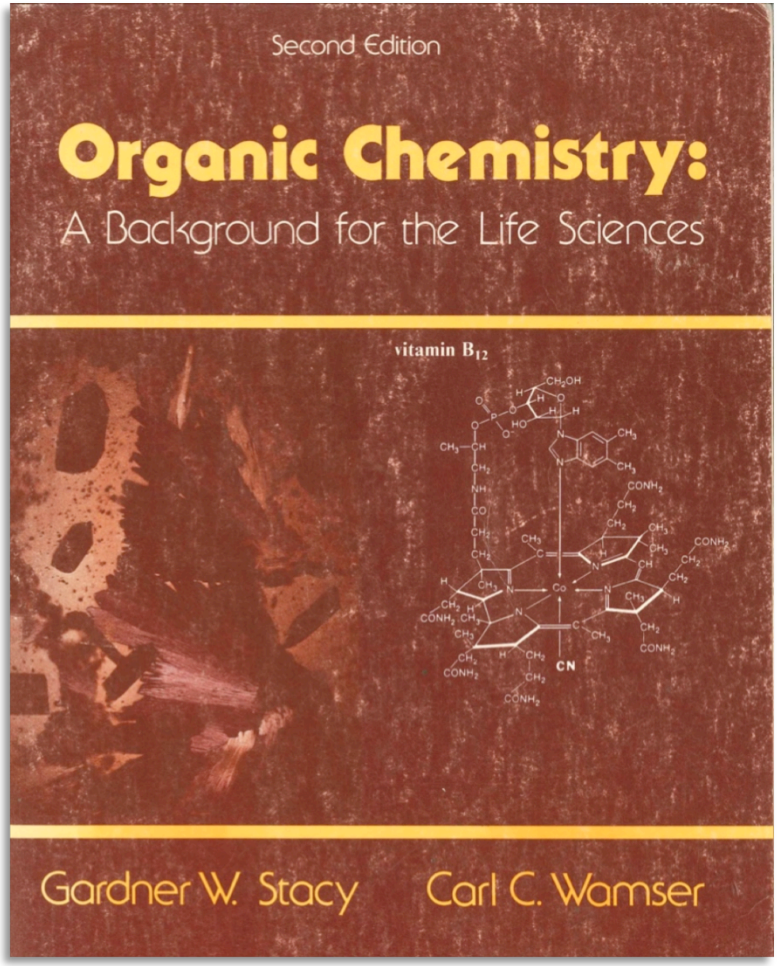
The Hammond-Gray Curriculum



1966-69

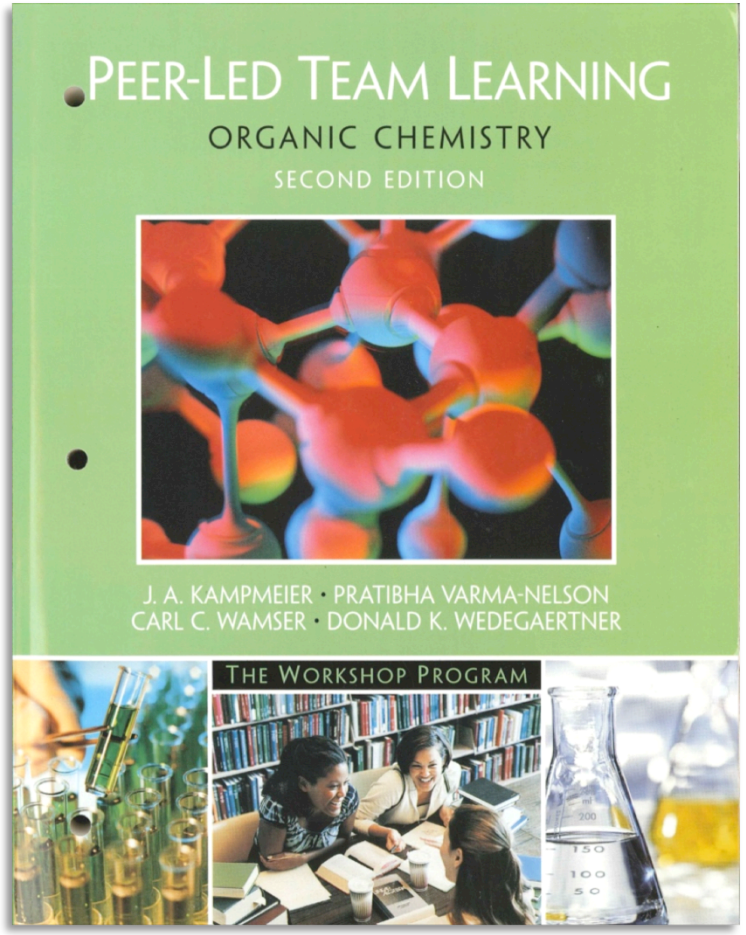
Textbook Writing Projects





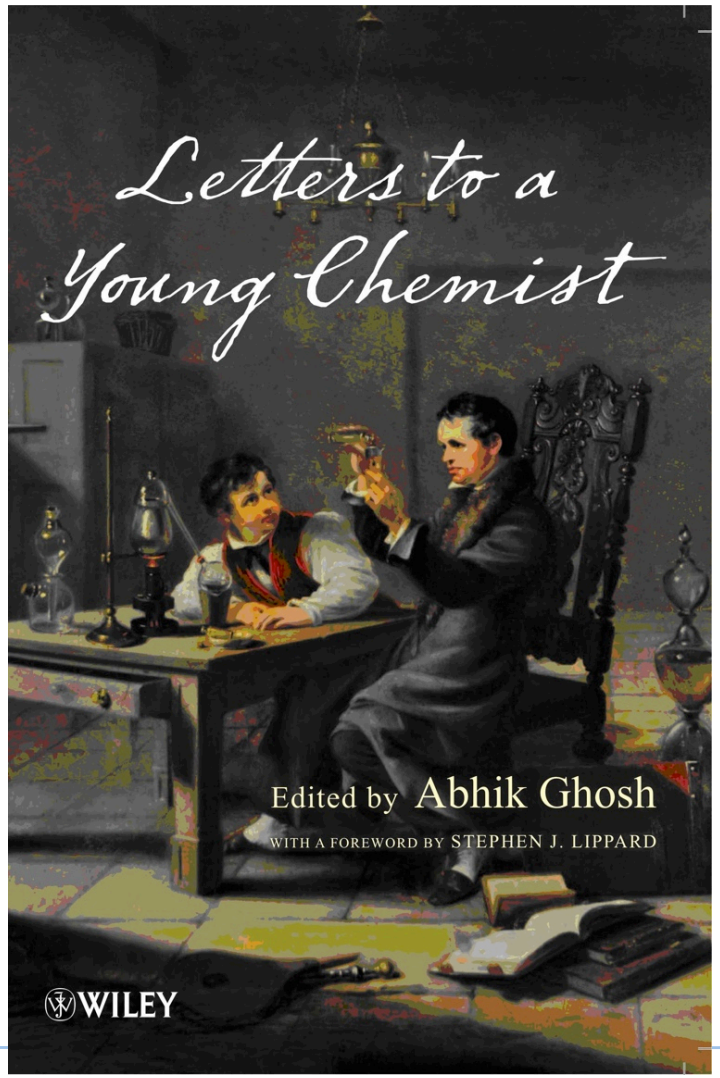
1976,1985

Workbook Writing Projects



2001,2006

Latest Writing Project

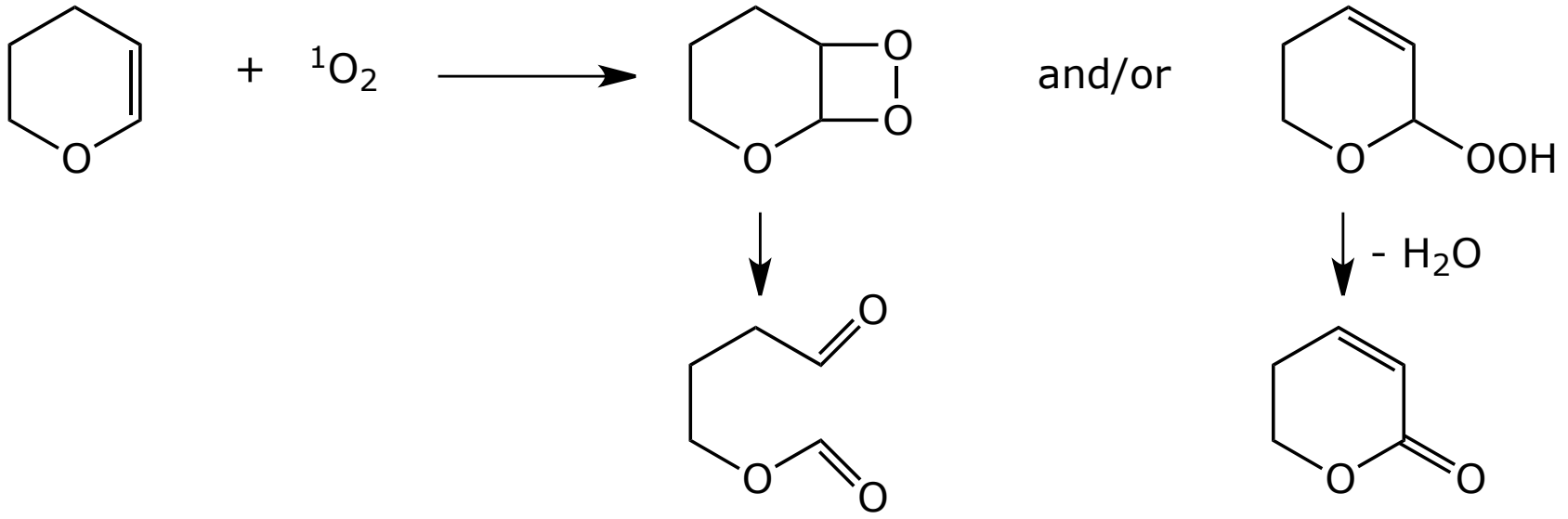


2011

Harvard University Postdoctoral Research

Paul D. Bartlett

Singlet Oxygen Chemistry



Reaction of Singlet Oxygen with 4-Methyl-2,3-dihydro-g-pyrans, A. A. Frimer, P. D. Bartlett, A. F. Boschung, J. G. Jewett, *J. Amer. Chem. Soc.*, **1977**, 99, 7977-7986.

1969-70

California State University, Fullerton

Andy Montana
Department Chair

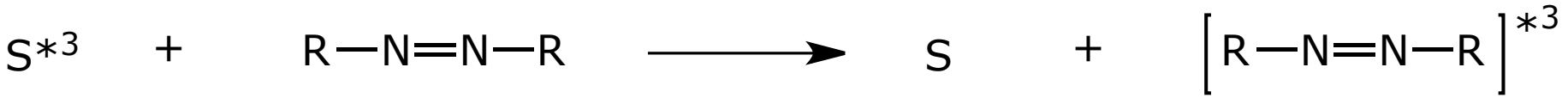
Mike King
First Research Student

CALIFORNIA STATE UNIVERSITY
FULLERTON

1970

The First Papers – Energy Transfer

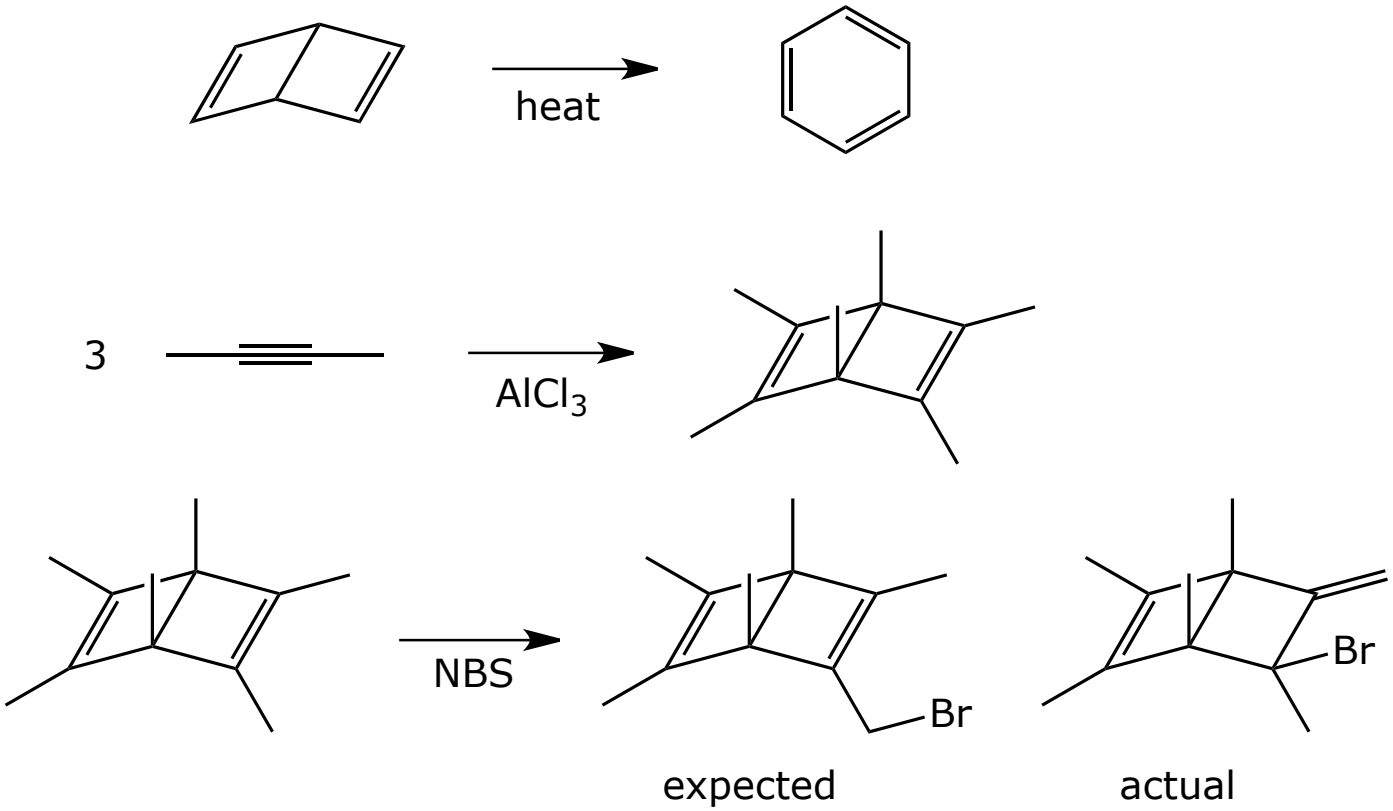
Flash Photolysis



R = n-Bu, i-Bu, s-Bu, t-Bu

- **Steric Effects in Singlet and Triplet Electronic Energy Transfer,** C. C. Wamser and P. L. Chang, *J. Amer. Chem. Soc.* **1973**, 95, 2044-5.
- **Steric Effects in Singlet and Triplet Electronic Energy Transfer to Azo Compounds**, C. C. Wamser, R. T. Medary, I. E. Kochevar, N. J. Turro, and P. L. Chang, *J. Amer. Chem. Soc.* **1975**, 97, 4864-9.
- **Singlet Electronic Energy Transfer to Azoalkanes; Separation of Collisional and Long-Range Mechanisms by Steric and Solvent Viscosity Effects**, C. C. Wamser, L. Lou, J. Mendoza, and E. Olson, *J. Amer. Chem. Soc.* **1981**, 103, 7228-32.

Dewar Benzenes

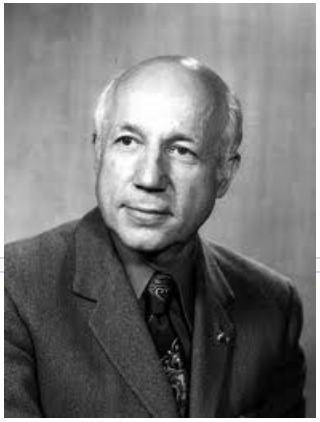


- **Hexamethyl(Dewar Benzene)**, S. A. Shama and C. C. Wamser, *Org. Synth.* **1983**, 61, 62-4.
- **Synthesis and Reactions of 5-Methylenebicyclo[2.2.0]hex-2-ene Derivatives from Hexamethyl(Dewar Benzene)**, C. C. Wamser, D. D. Ngo, M. J. Rodriguez, S. A. Shama, and T. L. Tran, *J. Amer. Chem. Soc.* **1989**, 111, 2162-2168.

1980s

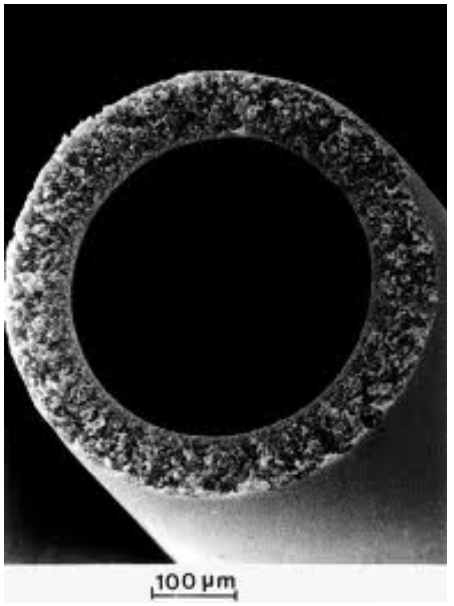
Sabbatical, UC Berkeley

Berkeley
UNIVERSITY OF CALIFORNIA



Melvin Calvin

Artificial Photosynthesis



- **Preparation and Properties of Porphyrin-Modified Hollow Fiber Membranes as Photosensitizers for Singlet Oxygen and for Artificial Photosynthesis**, C. C. Wamser, M. Calvin, and G. Graf, *J. Membr. Sci.* **1986**, 28, 31-46.

1980

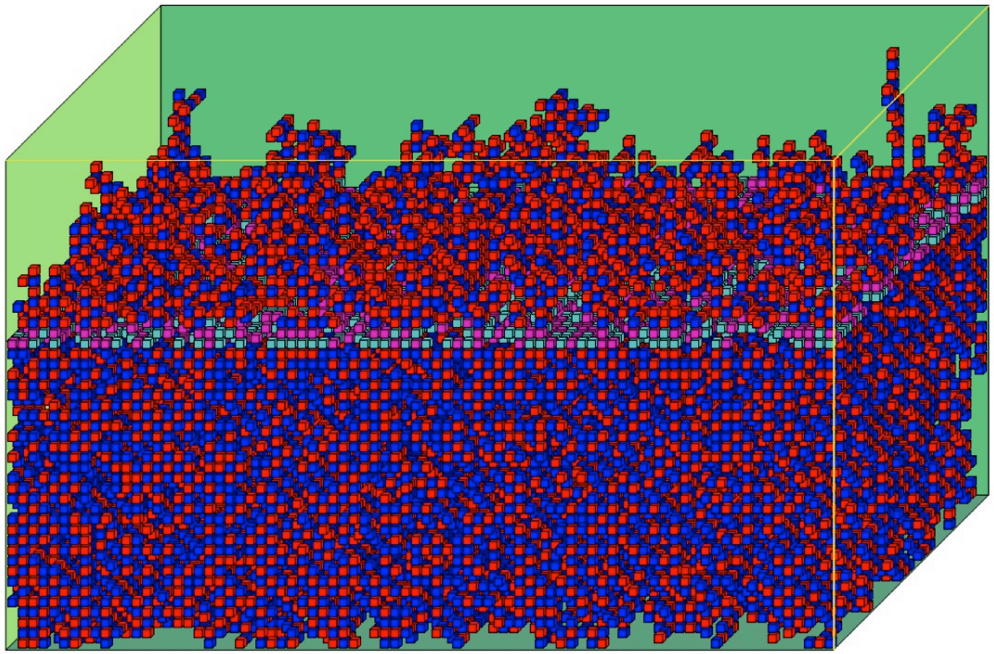
Portland State University

1983

Portland State University

Interfacial Polymerization

Bend Research, Inc.



- TAPP in H_2O (pH 3)
- TCCPP in CH_2Cl_2

- **Synthesis and Photoactivity of Chemically Asymmetric Polymeric Porphyrin Films Made by Interfacial Polymerization**, C. C. Wamser, R. R. Bard, V. Senthilathipan, V. C. Anderson, J. A. Yates, H. K. Lonsdale, G. W. Rayfield, D. T. Friesen, D. A. Lorenz, G. C. Stangle, P. van Eikeren, D. R. Baer, R. A. Ransdell, J. H. Golbeck, W. C. Babcock, J. J. Sandberg, and S. E. Clarke, *J. Amer. Chem. Soc.* **1989**, 111, 8485-8492.

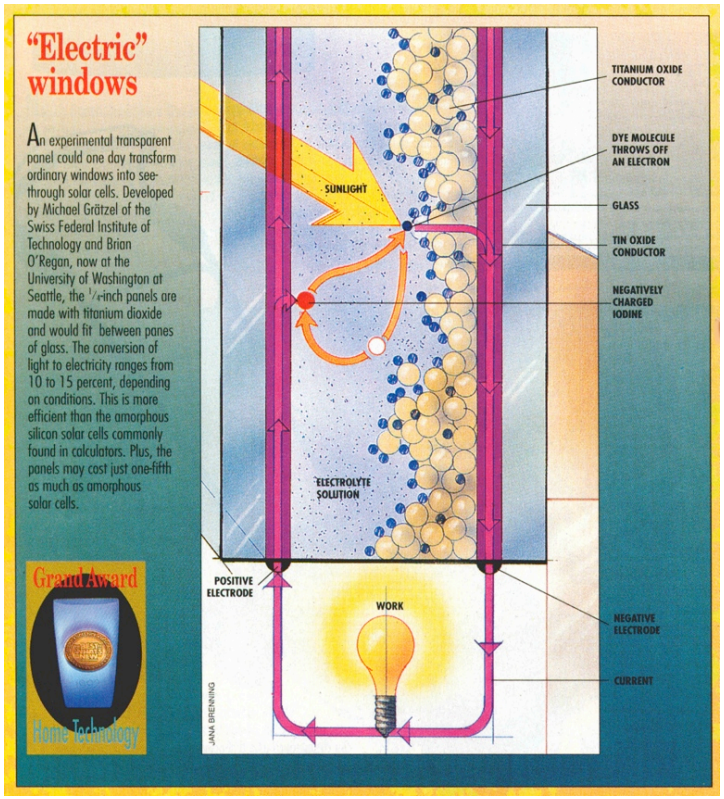
1980s

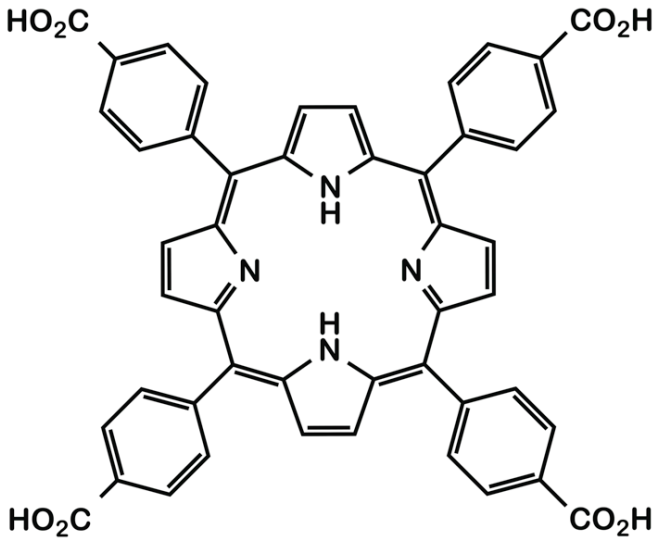
Sabbatical, EPFL

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Michael Grätzel

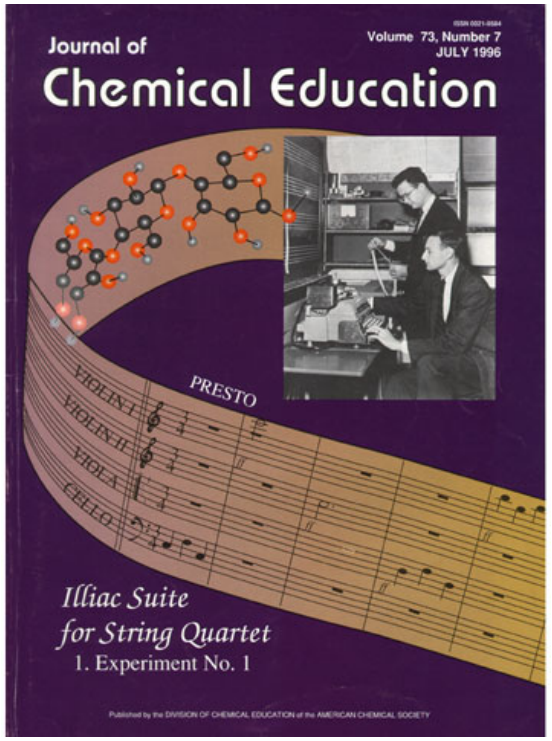
Dye-Sensitized Solar Cells





Adsorption and Photoactivity of Tetra(4-carboxyphenyl)porphyrin (TCPP) on Nano-particulate TiO_2, S. Cherian and C. C. Wamser, *J. Phys. Chem. B,* **2000,** 104(15), 3624-9. 1992

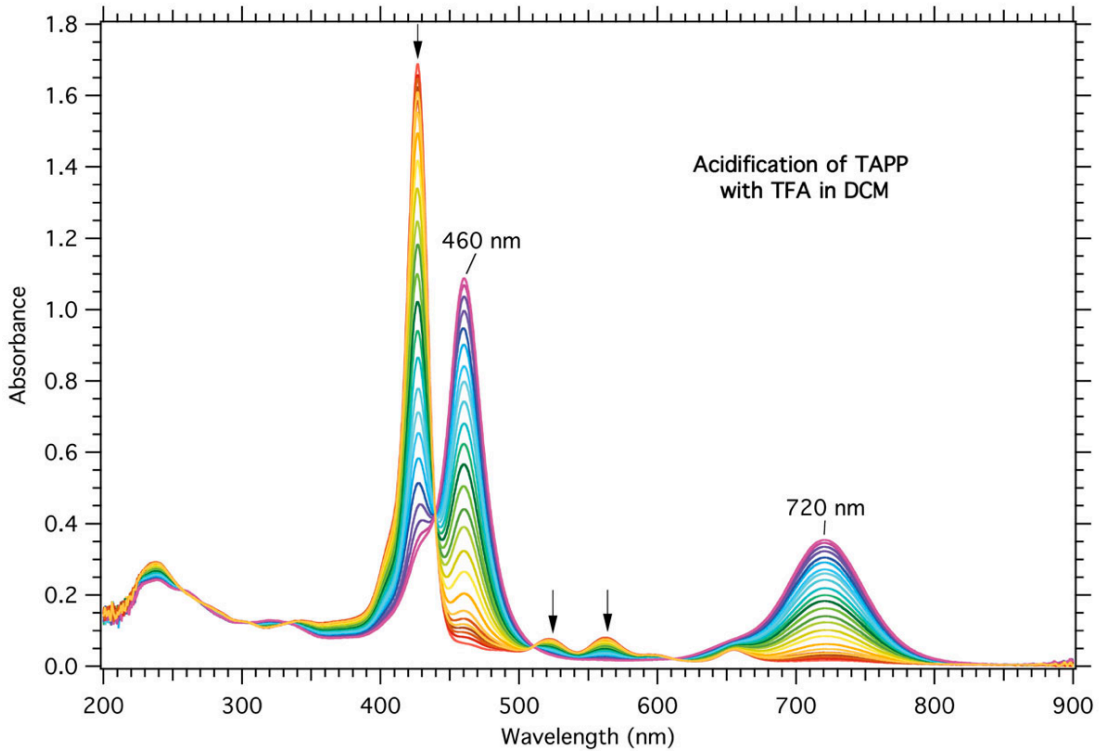
Chemistry and Music: Collaborations with My Father

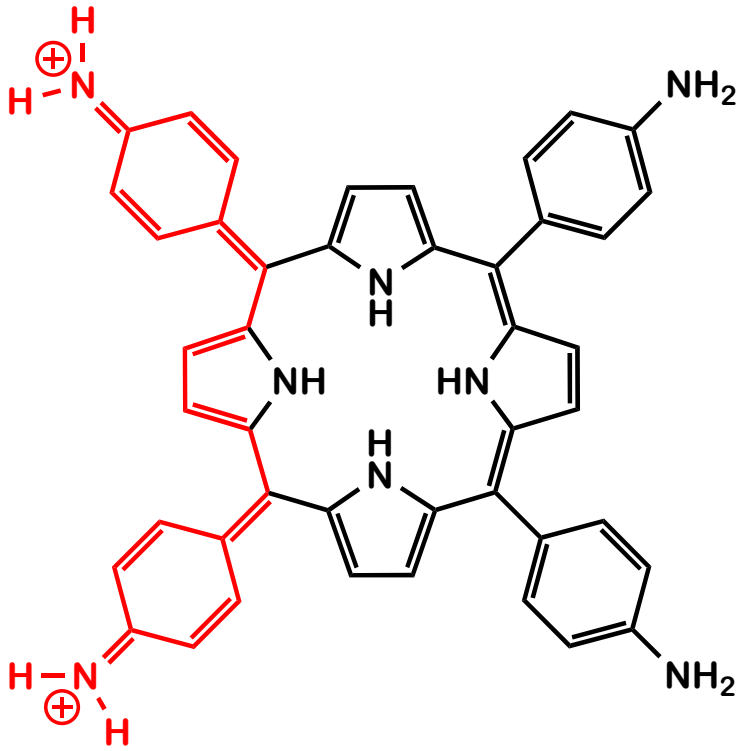


- **Lejaren A. Hiller, Jr.: A Memorial Tribute to a Modern Chemist-Composer**
  C. A. Wamser and C. C. Wamser, *J. Chem. Educ.* **1996**, 73(7), 601-607.
- **Computers, Chemistry, Cellos, and Chance: A Celebration of Lejaren A. Hiller, Jr.**
  C. C. Wamser and C. A. Wamser, *Chem. Heritage*, **1997**, 15(1), 8-9, 34-35.

1996

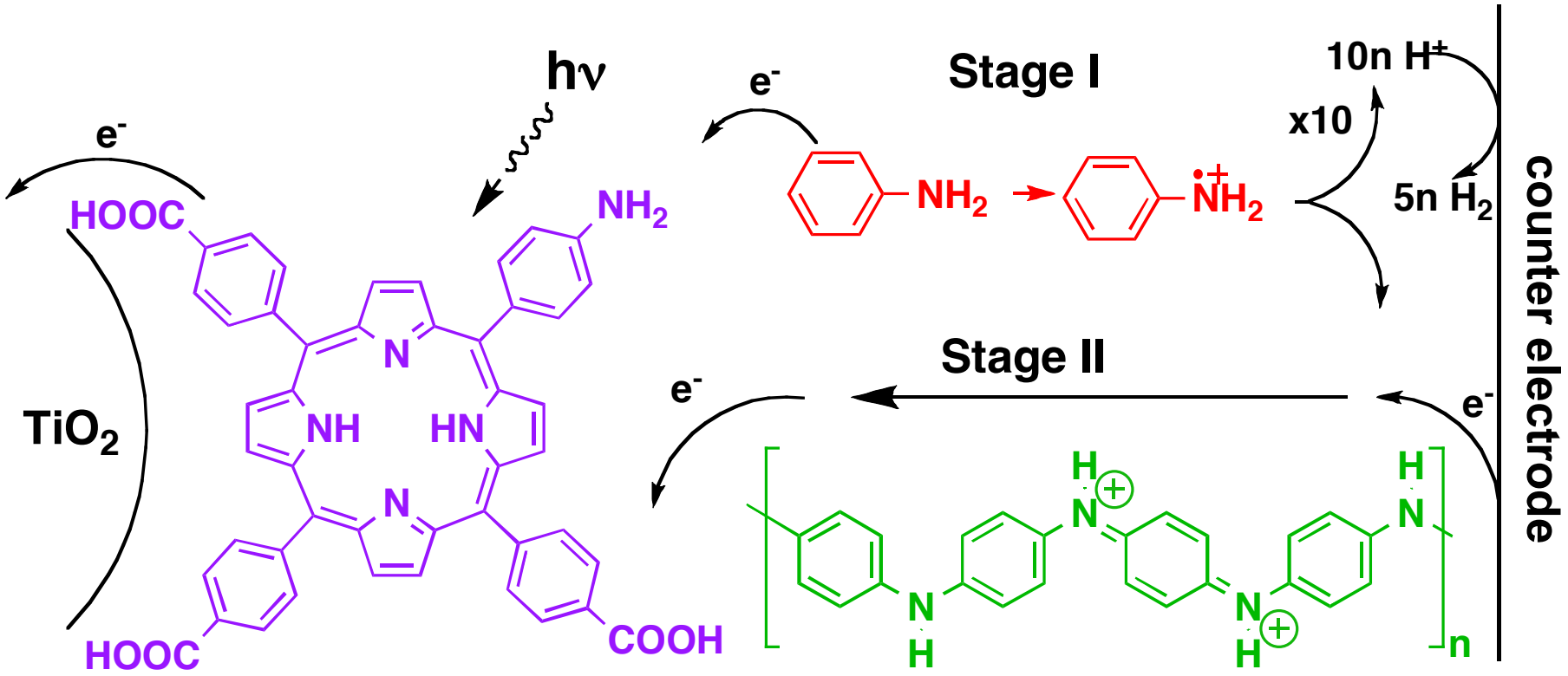
Hyperporphyrin Spectroscopy





- **Substituent and Solvent Effects on the Hyperporphyrin Spectra of Diprotonated Tetraphenylporphyrins**, J. Weinkauf, A. Schweiger, S. Cooper, and C. C. Wamser, *J. Phys. Chem. A*, **2003**, 107 (18), 3486-3496. 2003

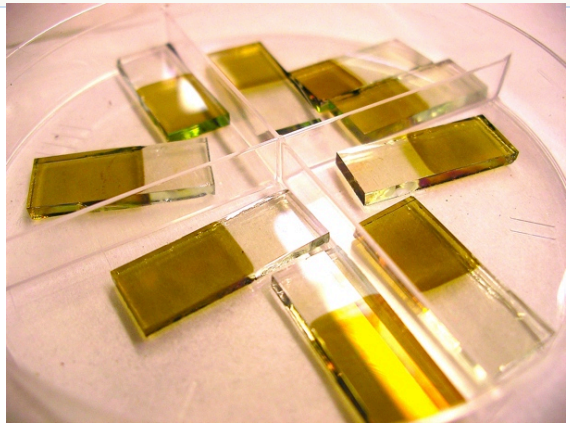
Solid-State Grätzel Cells



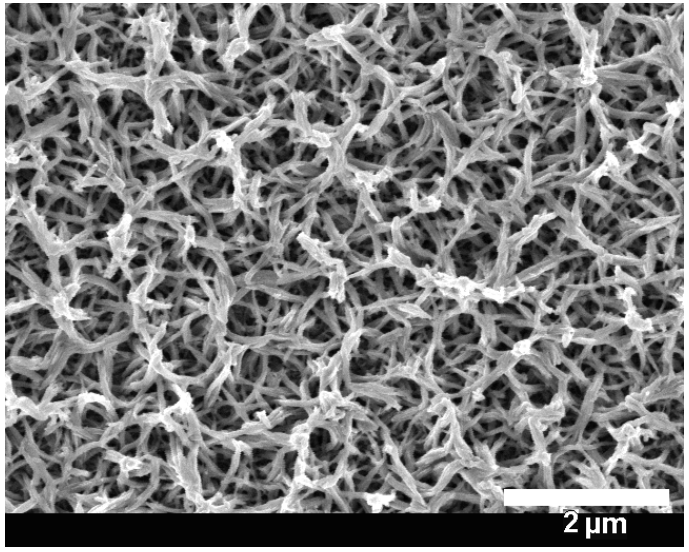
- **Photoelectropolymerization of Aniline in a Dye-Sensitized Solar Cell**, H.-S. Kim and C. C. Wamser, *Photochem. Photobiol. Sci.*, **2006**, 5 (10), 955-960.

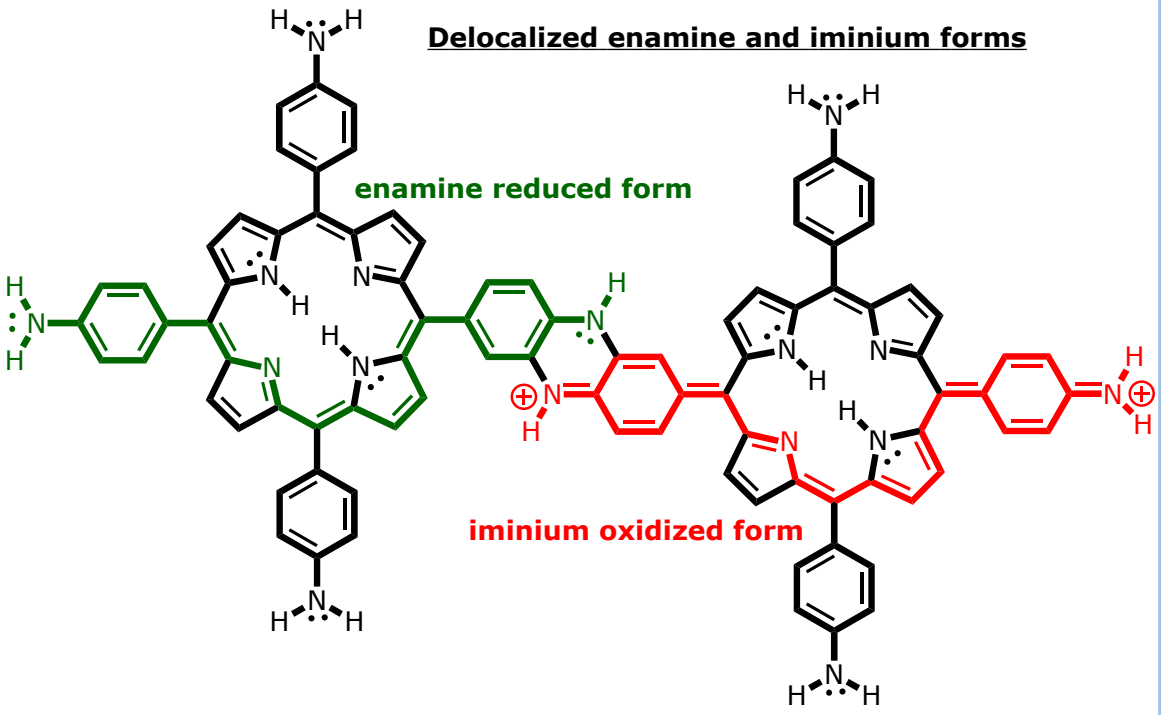
2006

Inverse Grätzel Cells



Poly-TAPP





Synthesis and Characterization of Electropolymerized Nanostructured Aminophenylporphyrin Films, M. G. Walter and C. C. Wamser, *J. Phys. Chem. C*, **2010**, 114, 7563-7574. 2010

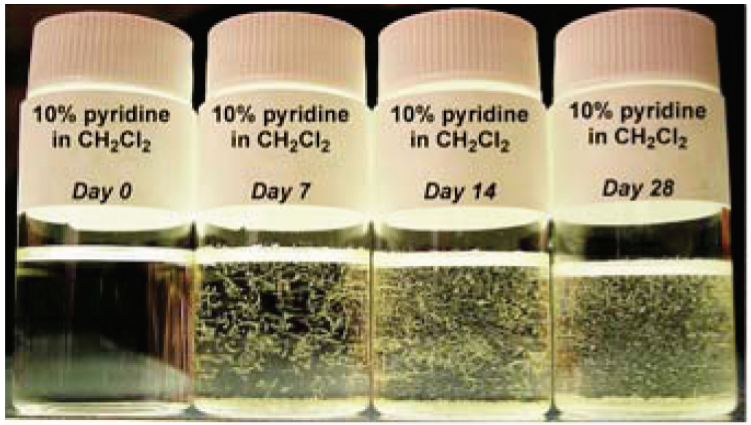
The Journal of Organic Chemistry

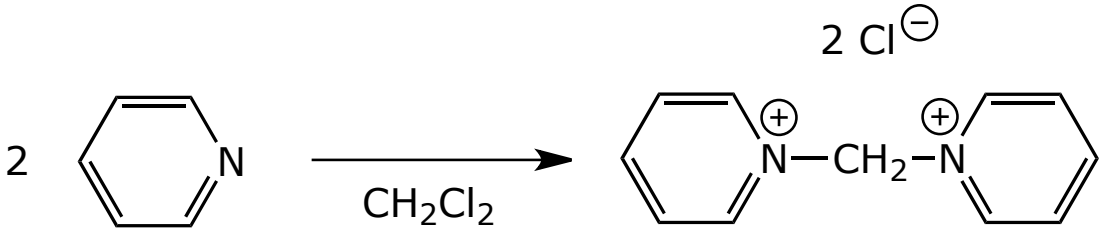
Listed below are the most accessed *JOC* articles during the second quarter of 2010:

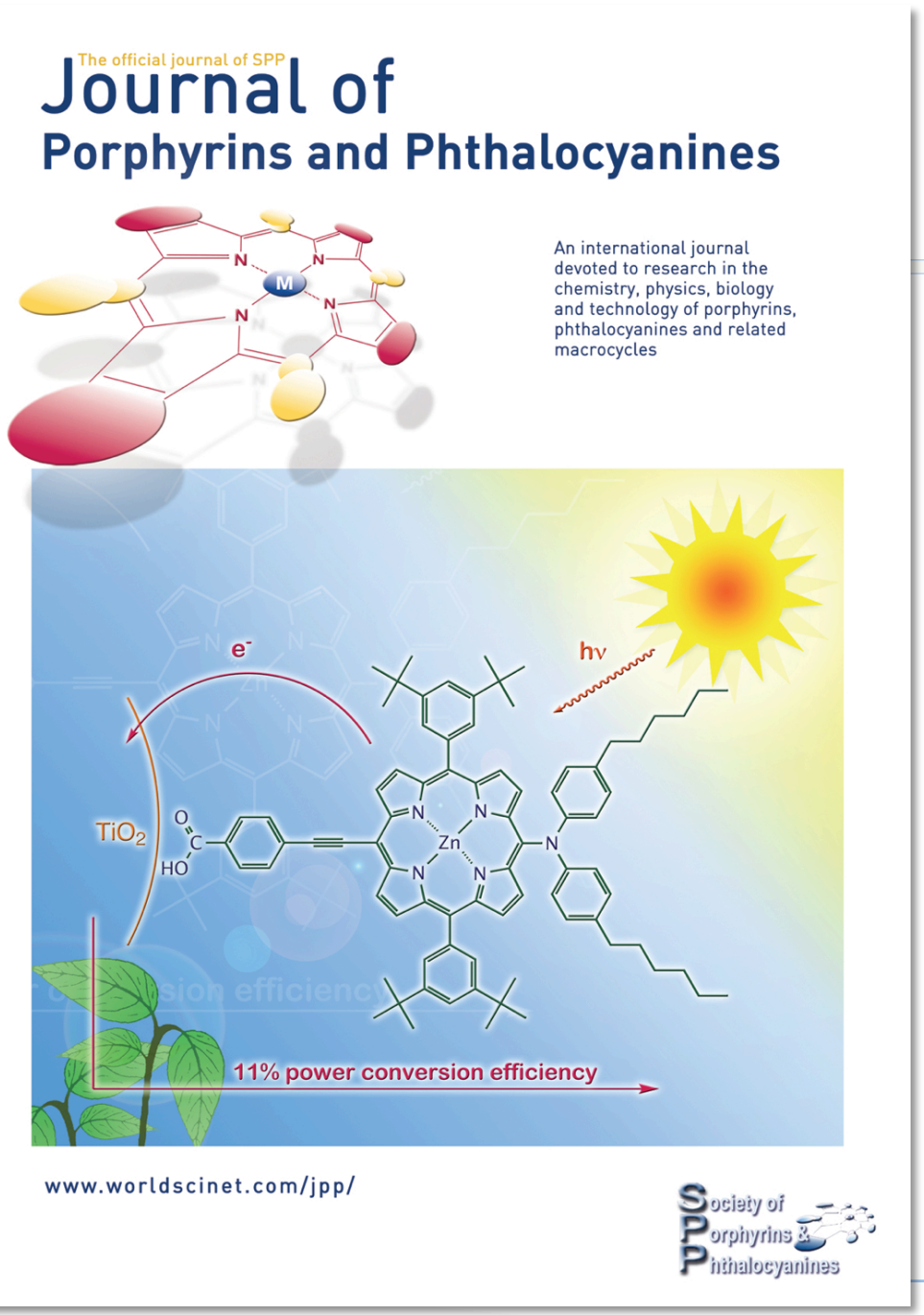
Reaction of Dichloromethane with Pyridine Derivatives under Ambient Conditions

Alexander B. Rudine, Michael G. Walter, and Carl C. Wamser

J. Org. Chem., **2010**, *75* (12), pp 4292–4295
DOI: 10.1021/jo100276m







Review Article

Porphyrins and Phthalocyanines in Solar Photovoltaic Cells

Alexander B. Rudine, Michael G. Walter, and Carl C. Wamser

J. Porphyrins Phthalocyanines, **2010**; *14*: 759–792.

2010

Sabbatical
Caltech

Nate Lewis

Polymer Solar Cells

2003


102969
Fifth International
Conference on Porphyrins
and Phthalocyanines
July 6-11, 2008, Moscow, Russia
Carl C. Wamser

Moscow, 2008

Sabbatical EPFL+

Lausanne, Switzerland

2011

Sabbatical EPFL+

University of Nantes, France

Fabrice Odobel

2011

Sabbatical EPFL+

Valencia, Spain

2011

Sabbatical EPFL+

Italy - Milan, Pavia, Venice

2011

Sabbatical EPFL+

University of Tromso, Norway

Abhik Ghosh

2011

Sabbatical EPFL+

University of Edinburgh, Scotland

2011

PSU Photovoltaic Test Facility

Co-PIs:

David Sailor
Todd Rosenstiel
(Erik Johansson)

Sponsors:

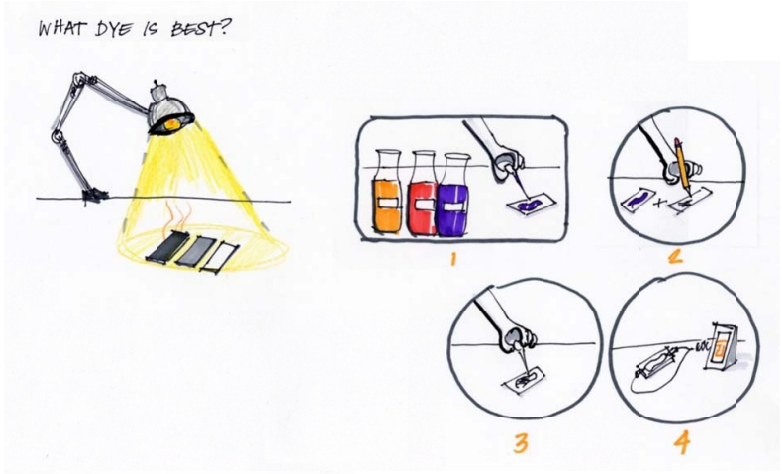
NSF
PGE
OR BEST
PSU ISS
Portland BES
PSU OGSR
EC Company
UO SRML

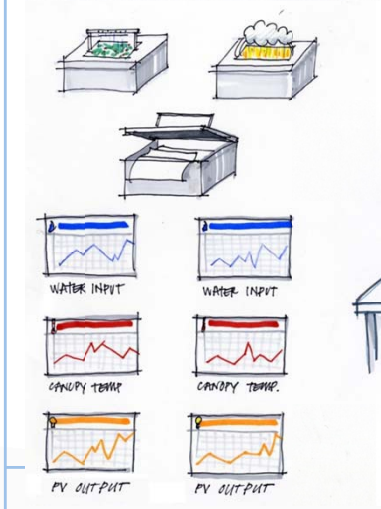
2009 -

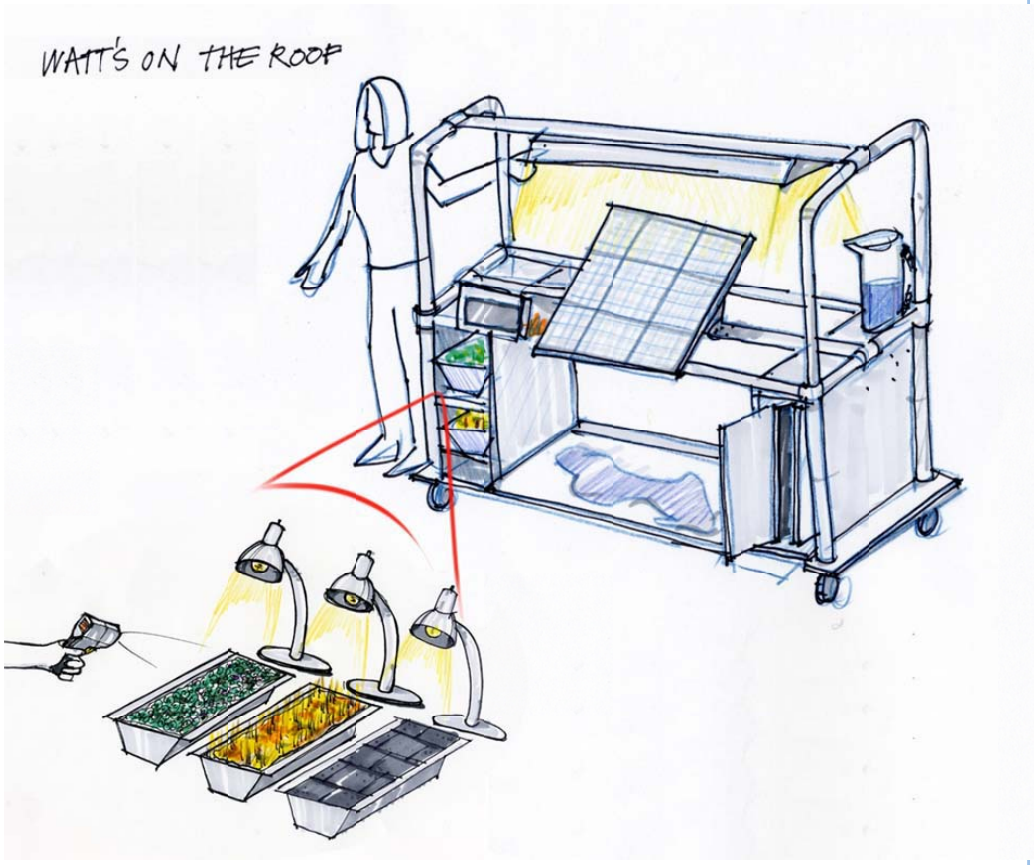
NSF - CRPA

OMSI

Connecting Researchers to Public Audiences







2012-14

Humanity's Top Ten Problems for the next 50 years

1. ENERGY
2. WATER
3. FOOD
4. ENVIRONMENT
5. POVERTY
6. TERRORISM & WAR
7. DISEASE
8. EDUCATION
9. DEMOCRACY
10. POPULATION

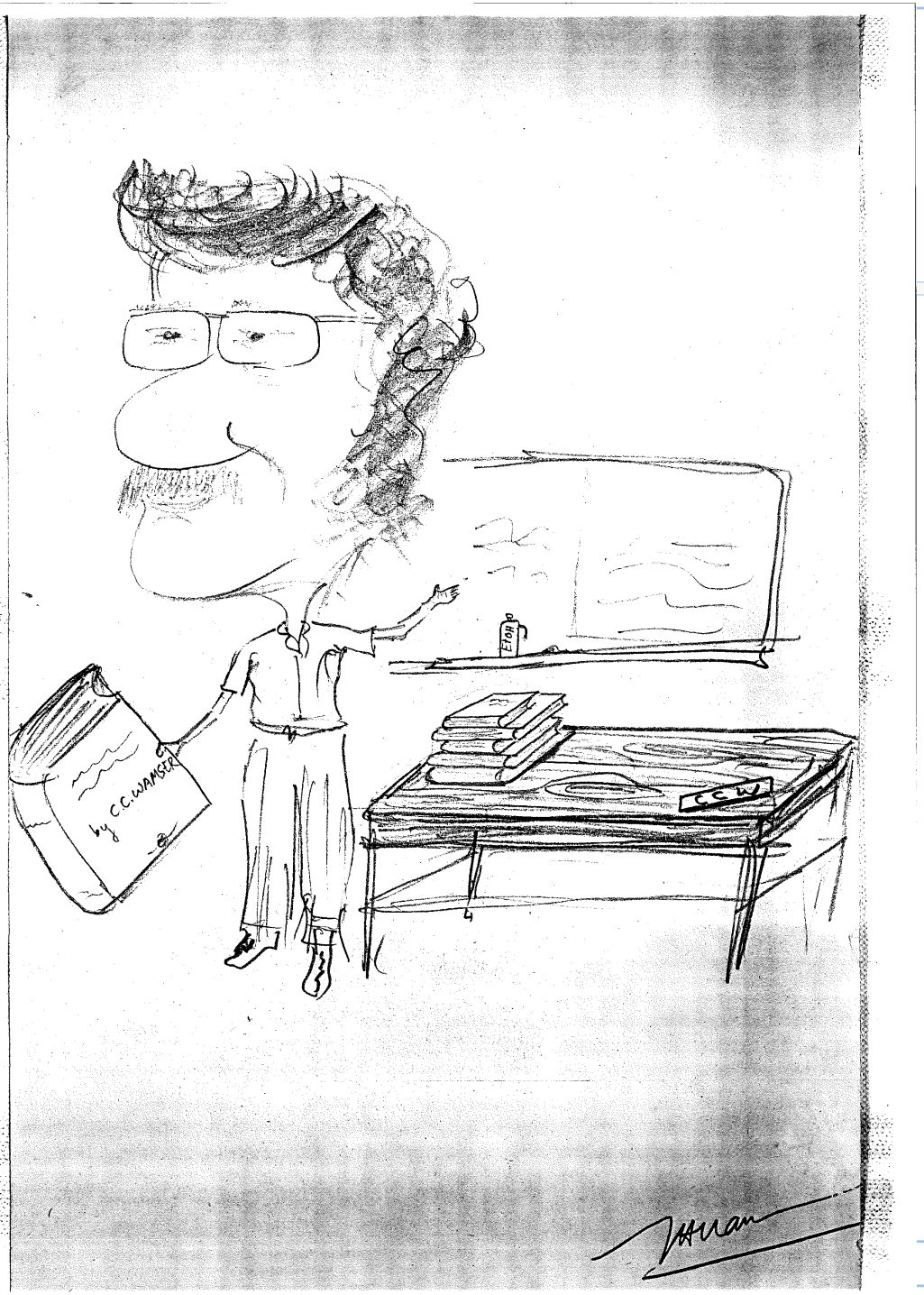
Partners in Science
January 18, 2003

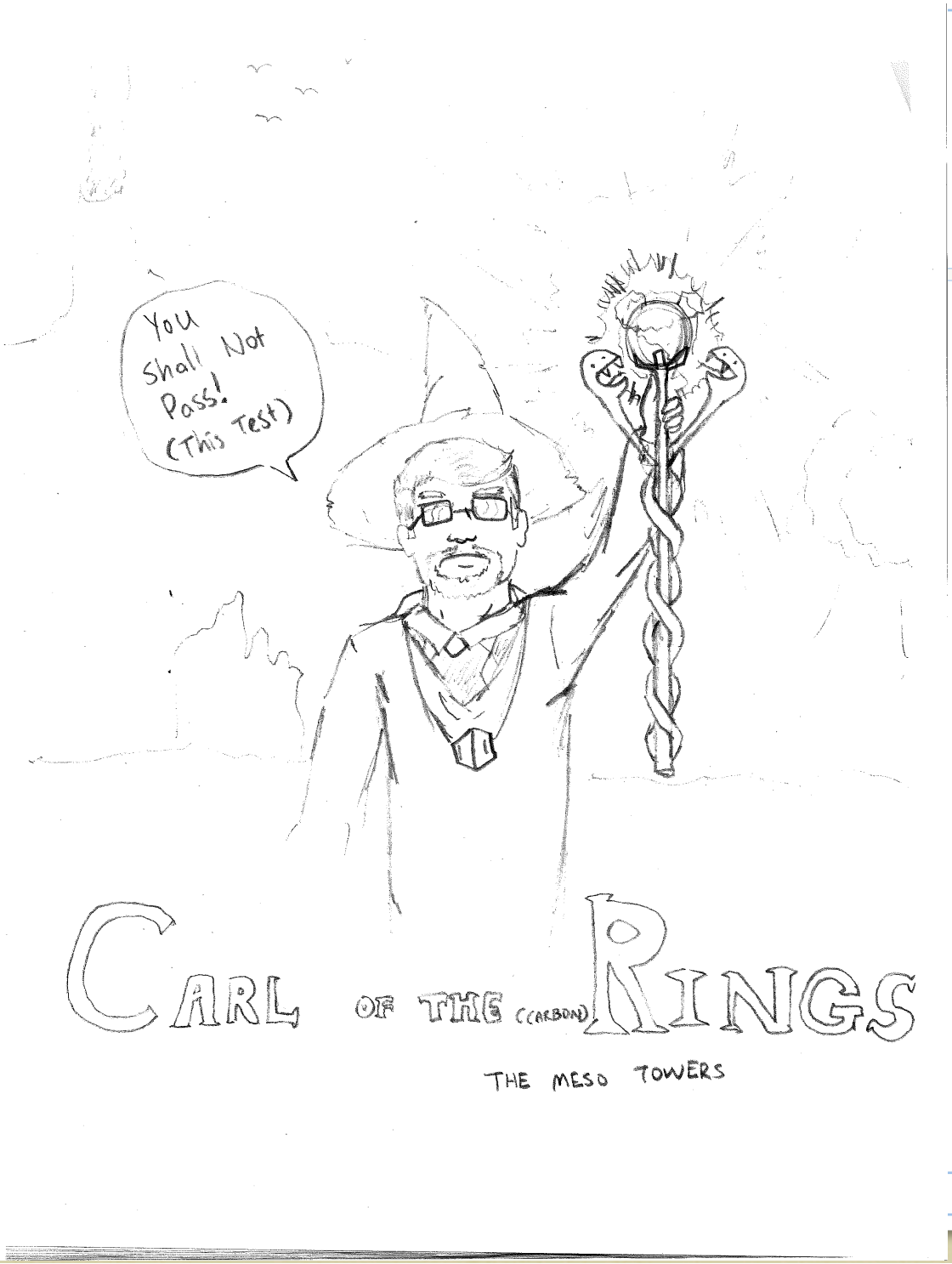
R. E. Smalley
Rice University

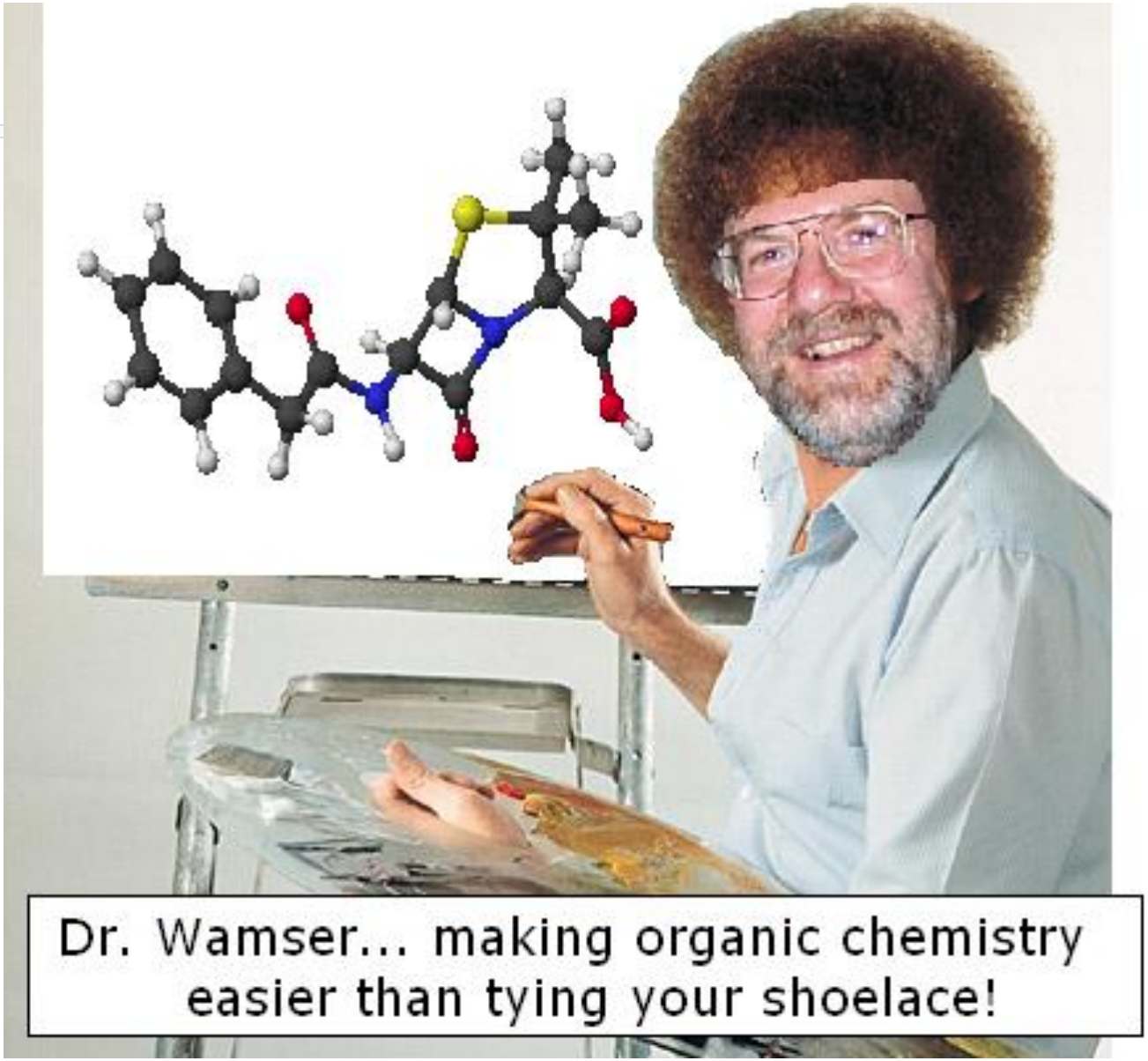
O Grignard

The carbonyl is polarized
The carbon end is plus.
The nucleophile will thus attack
The carbon nucleus.
The Grignard makes an alcohol,
Of types there are but three.
It makes a bond
To correspond
From C to shining C.

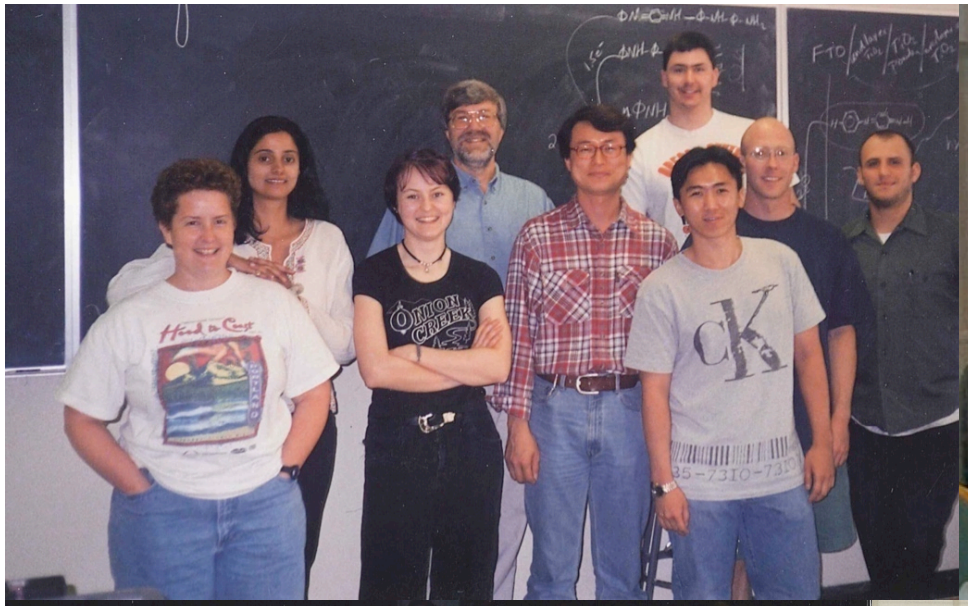
Lyrics by Frank Westheimer (Harvard Univ)


by C.C. WAMSER


You Shall Not Pass! (This Test)
CARL OF THE (CARBON) RINGS
THE MESO TOWERS


Dr. Wamser... making organic chemistry
easier than tying your shoelace!

Organic Chemistry – Spring 2012


OMION CREEK
cK


Harold Zeh
Intel
SCIENCE
Brian McCarthy
$5,000.00
Five Thousand and 7/c
Portland State
Howard Payne
06
CA
CAT


09/04/2004


08/20/2003


WEST LUTHERAN
2007-08