

Organic chemistry of singlet oxygen

Guest editor: Alexander Greer

Department of Chemistry and Graduate Center, The City University of New York (CUNY)—Brooklyn College, Brooklyn, NY 11210, USA

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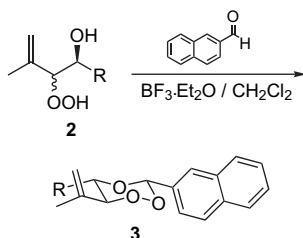
Announcement: Tetrahedron Symposia-in-Print
Preface

pp 10609–10611
p 10613

ARTICLES

Singlet oxygen addition to chiral allylic alcohols and subsequent peroxyacetalization with β -naphthaldehyde: synthesis of diastereomerically pure 3- β -naphthyl-substituted 1,2,4-trioxanes
Axel G. Griesbeck,* Tamer T. El-Idreesy and Johann Lex

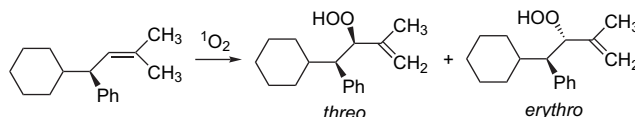
pp 10615–10622



Intrazeolite photooxygenation of chiral alkenes. Control of facial selectivity by confinement and cation- π interactions

pp 10623–10632

Manolis Stratakis,* Christos Raptis, Nikolettta Sofikiti, Constantinos Tsangarakis, Giannis Kosmas, Ioannis-Panagiotis Zaravinos, Dimitris Kalaitzakis, Dimitris Stavroulakis, Constantinos Baskakis and Aggeliki Stathouloupoulou



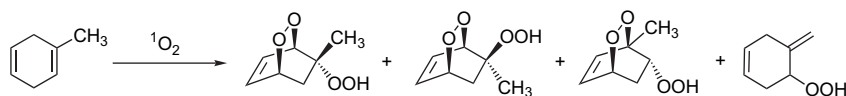
In solution: *threo/erythro* = 18/82

Within zeolite NaY: *threo/erythro* = 91/9

Regioselectivity in the ene-reaction of singlet oxygen with cyclic alkenes: photooxygenation of methyl-substituted 1,4-cyclohexadiene derivatives

pp 10633–10638

Şengül Dilem Yardımcı, Nihal Kaya and Metin Balci*

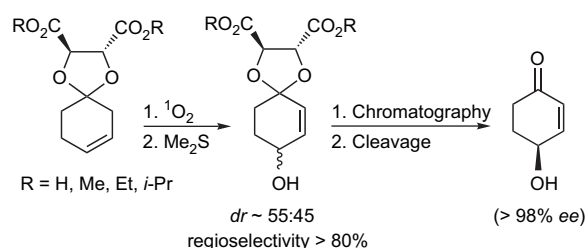


The photooxygenation of methyl-substituted cyclohexa-1,4-diene derivatives has been searched. The substituent effect is discussed.

Auxiliary controlled singlet-oxygen ene reactions of cyclohexenes

pp 10639–10646

Werner Fudickar, Katja Vorndran and Torsten Linker*

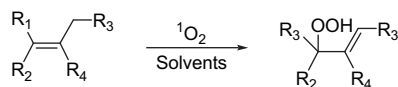

A comparative mechanistic analysis of the stereoselectivity trends observed in the oxidation of chiral oxazolidinone-functionalized enecarbamates by singlet oxygen, ozone, and triazolidinedione

J. Sivaguru, Thomas Poon, Catherine Hooper, Hideaki Saito, Marissa R. Solomon, Steffen Jockusch, Waldemar Adam, Yoshihisa Inoue and Nicholas J. Turro*

	Reactive species	Stereo-differentiating structural factor	Stereoselectivity
		C_4	Low
	O_3	$C_4 + \text{alkene}$	Low to Moderate
	1O_2	$C_4 + \text{alkene} + C_{3'}$	High

Stereoelectronic and solvent effects on the allylic oxyfunctionalization of alkenes with singlet oxygen

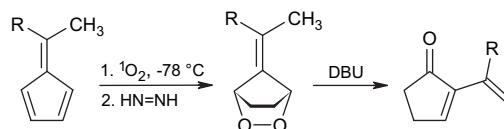
Mariza N. Alberti and Michael Orfanopoulos*



Unusual endoperoxide isomerizations: a convenient entry into 2-vinyl-2-cyclopentenones from saturated fulvene endoperoxides

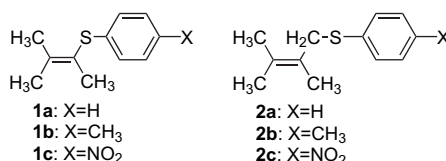
pp 10676–10682

Ihsan Erden,* Nüket Öcal, Jiangao Song, Cindy Gleason and Christian Gärtner

**A comparison of hydrogen bonding solvent effects on the singlet oxygen reactions of allyl and vinyl sulfides, sulfoxides, and sulfones**

pp 10683–10687

Kristina L. Stensaas,* Brent V. McCarty, Natacha M. Touchette and James B. Brock

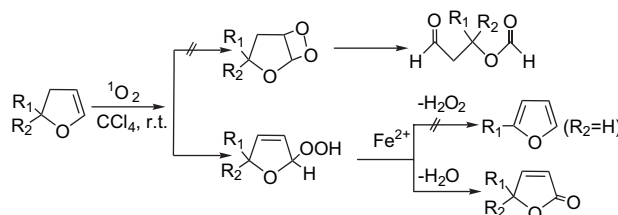


The singlet oxygen photooxidation of several allyl and vinyl sulfides, sulfoxides, and sulfones were conducted in deuterated solvents. The results indicate that only vinyl sulfides are susceptible to hydrogen bonding solvent effects.

Synthesis of α,β -unsaturated γ -lactones via photooxygenation of 2,3-dihydrofurans followed by ferrous ion-catalyzed *gem*-dehydration

pp 10688–10693

Yu-Zhe Chen, Li-Zhu Wu,* Ming-Li Peng, Dong Zhang, Li-Ping Zhang and Chen-Ho Tung*



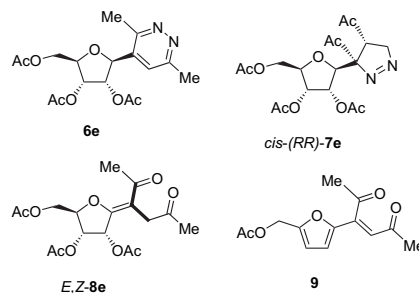
Photooxygenation of 2,3-dihydrofurans in CCl_4 at ambient temperature followed by ferrous ion-catalyzed *gem*-dehydration of the yielded allylic hydroperoxides afford the corresponding α,β -unsaturated γ -lactones in good to excellent yields.

Dye-sensitized photooxygenation of sugar-furans as synthetic strategy for novel C-nucleosides and functionalized *exo*-glycals

pp 10694–10699

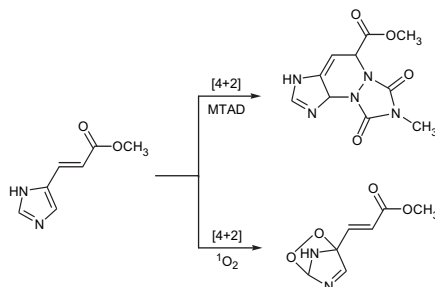
Flavio Cermola* and M. Rosaria Iesce

The methylene blue-sensitized photooxygenation of β -ribofuranosyl furan **1e** followed by in situ Et_2S treatment afforded the conformationally stable β -ribofuranoside **4e** almost quantitatively. The latter was converted to pyridazine C-nucleoside **6e** by cyclization with NH_2NH_2 and to pyrazoline **7e** through a 1,3-dipolar cycloaddition with diazomethane. Attempts to epoxidize the double bond failed both by dimethyldioxirane (DMDO), which left **4e** unchanged, and by $\text{NET}_3/t\text{-BuOOH}$ or $\text{NaOO-}t\text{-Bu}$ which respectively afforded the new and unexpected *exo*-glycals *E,Z*-**8e** and the novel furan derivative **9**.



Reactions of urocanic acid (UCA) methyl esters with singlet oxygen and 4-methyl-1,2,4-triazoline-3,5-dione (MTAD) pp 10700–10708

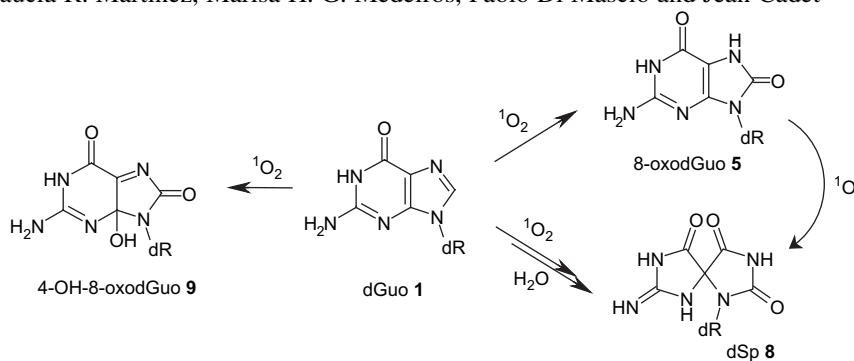
Roberto Roa and Kevin E. O'Shea*



Singlet oxygen oxidation of 2'-deoxyguanosine. Formation and mechanistic insights

pp 10709–10715

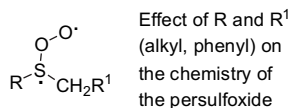
Jean-Luc Ravanat, Glaucia R. Martinez, Marisa H. G. Medeiros, Paolo Di Mascio and Jean Cadet*



Reaction of singlet oxygen with some benzylic sulfides

pp 10716–10723

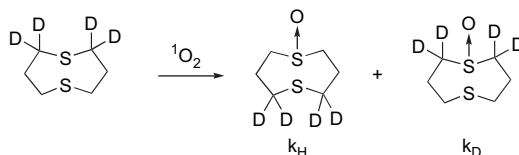
Sergio M. Bonesi, Maurizio Fagnoni, Sandra Monti and Angelo Albini*



The hydroperoxysulfonium ylide. An aberration or a ubiquitous intermediate?

pp 10724–10728

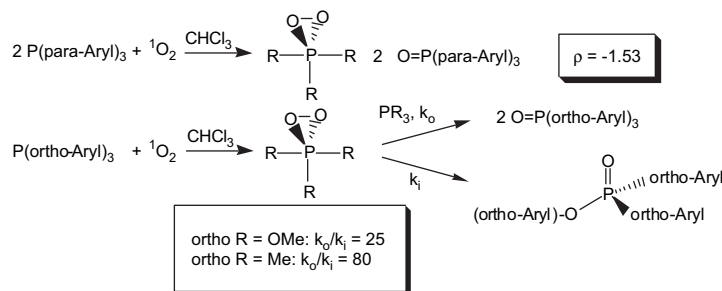
Edward L. Clennan* and Chen Liao



Chemistry of singlet oxygen with arylphosphines

pp 10729–10733

Dong Zhang, Bin Ye, David G. Ho, Ruomei Gao and Matthias Selke*

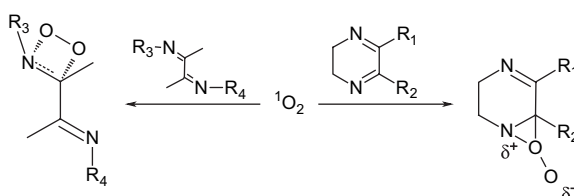


Steric and electronic effects on the reactivity of arylphosphines with singlet oxygen are reported.

Solvent effect on the sensitized photooxygenation of cyclic and acyclic α -diimines

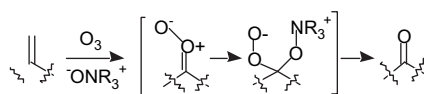
pp 10734–10746

Else Lemp,* Antonio L. Zanocco, German Günther and Nancy Pizarro

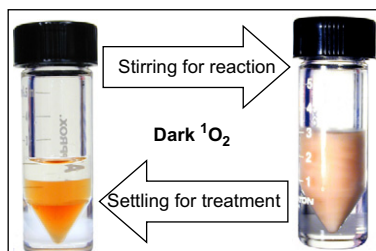
**'Reductive ozonolysis' via a new fragmentation of carbonyl oxides**

pp 10747–10752

Chris Schwartz, Joseph Raible, Kyle Mott and Patrick H. Dussault*

**Dark singlet oxygenation of organic substrates in single-phase and multiphase microemulsion systems** pp 10753–10761

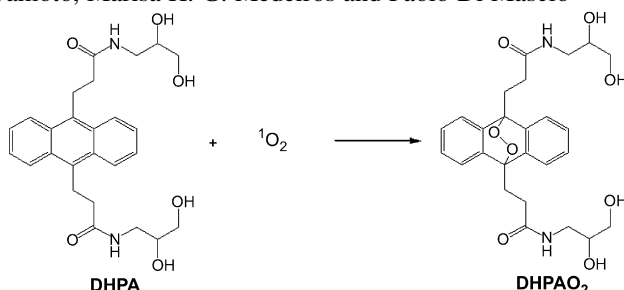
Jean-Marie Aubry,* Waldemar Adam, Paul L. Alsters, Cédric Borde, Sébastien Queste, Jean Marko and Véronique Nardello



The chemical source of singlet oxygen $\text{H}_2\text{O}_2/\text{MoO}_4^{2-}$ can oxidize labile and hydrophobic substrates in microemulsion. The respective advantages and limitations of single-phase and multiphase microemulsion systems are shortly reviewed and discussed.

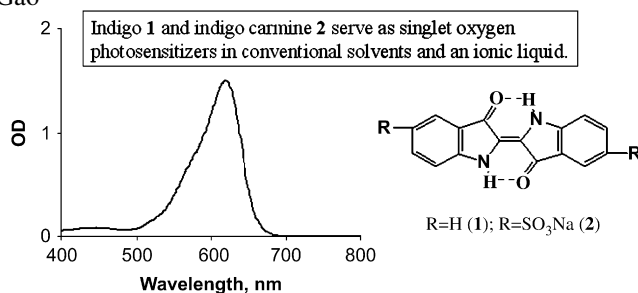
Synthesis of a hydrophilic and non-ionic anthracene derivative, the *N,N'*-di-(2,3-dihydroxypropyl)-9,10-pp 10762–10770 anthracenedipropanamide as a chemical trap for singlet molecular oxygen detection in biological systems

Glaucia R. Martinez, Flávia Garcia, Luiz H. Catalani, Jean Cadet, Mauricio C. B. Oliveira, Graziella E. Ronsein, Sayuri Miyamoto, Marisa H. G. Medeiros and Paolo Di Mascio*



Possible singlet oxygen generation from the photolysis of indigo dyes in methanol, DMSO, water, and ionic liquid, 1-butyl-3-methylimidazolium tetrafluoroborate pp 10771–10776

Naveen Gandra, Aaron T. Frank, Onica Le Gendre, Nahed Sawwan, David Aebisher, Joel F. Liebman, K. N. Houk, Alexander Greer* and Ruomei Gao*



*Corresponding author

Supplementary data available via ScienceDirect

COVER

The cover figure shows the reaction of homochiral cyclohexene ketals with ${}^1\text{O}_2$, which gives hydroperoxides and after reduction the corresponding allylic alcohols with excellent regioselectivity. Mechanistic considerations were used to rationalize the regioselectivity. The work was conducted by Torsten Linker and co-workers.

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