

**Photochemistry of organic molecules in water, micelles and cavitands**  
**Work initiated at Indian Institute of Science, Bangalore**

**(a) Water**

Photodimerization of coumarin in aqueous and micellar media.

K. Muthuramu and V. Ramamurthy, *J. Org. Chem.*, 47, 3976, **1982**.

Consequence of hydrophobic association in photoreactions: Photodimerization of stilbenes in water.

M. S. Syamala and V. Ramamurthy, *J. Org. Chem.*, 51, 3712, **1986**.

Consequence of hydrophobic association in photoreactions: Photodimerization of alkylcinnamates in water.

S. Devanathan and V. Ramamurthy, *J. Photochem. Photobiol.*, A, 40, 67, **1987**.

**(b) Micelles**

Inhibition of self-quenching in thioketones by micellar compartmentalization.

V. Ramesh and V. Ramamurthy, *J. Photochem.*, 20, 47, **1982**.

Photodimerization of coumarins in micelles: Limitations of alignment effect.

K. Muthuramu, N. Ramnath and V. Ramamurthy, *J. Org. Chem.*, 48, 1872, **1983**.

Reactive State Selectivity in Photodimerization through Micellar Counter-ion Effects: Photodimerization of Acenaphthylenes.

V. Ramesh and V. Ramamurthy, *J. Photochem.*, 24, 395, **1984**.

Control of regiochemistry in photodimerization through micellar pre-orientational effect: 2-substituted naphthalenes.

V. Ramesh and V. Ramamurthy, *J. Org. Chem.*, 49, 536, **1984**.

7-Alkoxy coumarins as fluorescence probes for microenvironments.

K. Muthuramu and V. Ramamurthy, *J. Photochem.*, 26, 57, **1984**.

Micellar control of photochemical reactions.

V. Ramamurthy, *Proc. Indian Acad. Sci.*, 93, 635, **1984**.

Photochemical reactions in constrained systems: Changes in mode of solubilization due to long chain hydrophobic groups.

N. Ramnath and V. Ramamurthy, *J. Org. Chem.*, 49, 2827, **1984**.

Selectivity in chemical reactions in micellar media: Photodimerization of substituted coumarins in micelles.

K. Muthuramu and V. Ramamurthy, *Indian. J. Chem.*, 23B, 502, **1984**.

Structure of micelles—A review.

N. Ramnath, V. Ramesh and V. Ramamurthy, *J. Sci. Ind. Res.*, *44*, 199, **1985**.

Micellar structure and micellar control of photochemical reactions.

N. Ramnath, V. Ramesh and V. Ramamurthy, *J. Photochem.*, *31*, 75, **1985**.

Photoreactions in hydrophobic pockets.

M. S. Syamala, S. Devanathan and V. Ramamurthy, *Proc. Ind. Acad. Sci.*, *98*, 391, **1987**.

Intramolecular orientation at the micellar interface: Control of Norrish type I and type II reactivity of benzoinalkylethers via conformational effects.

S. Devanathan and V. Ramamurthy, *J. Phys. Org. Chem. 1*, 91, **1988**.

Modification of photochemical reactivity by incorporation of reactants into hydrophobic pockets and cavities: Conformational and cage effects.

S. Devanathan, G. Dasaratha Reddy and V. Ramamurthy in *Surfactants in solution: Modern Aspects* (Proceedings of the 6th international symposium on surfactants in solution), Ed., K. L. Mittal, Plenum Press, New York, 1990.

### **(c) Cyclodextrins, Cucurbiturils, Calixarenes and Pd Nanocage**

Selectivity in the Photochemistry of  $\alpha$ -ionyl and  $\alpha$ -ionylidene derivatives in  $\alpha$ -cyclodextrin: Microsolvent effect.

P. Arjunan and V. Ramamurthy, *J. Photochem.*, *33*, 123, **1986**.

Modification of chemical reactivity by cyclodextrins: Observation of moderate effects on Norrish type I and type II photobehavior.

S. Sharat, G. Usha, C. H. Tung, N. J. Turro and V. Ramamurthy, *J. Org. Chem.*, *51*, 941, **1986**.

Modification of the photochemistry by cyclodextrin complexation: Competitive Norrish type I and type II reactions of benzoin alkyl ethers.

G. Dasaratha Reddy, G. Usha, K. V. Ramanathan and V. Ramamurthy, *J. Org. Chem.*, *51*, 3085, **1986**.

Modification of the photochemical behaviour of organic molecules by cyclodextrin: Geometric isomerization of stilbenes and alkyl cinnamates.

M. S. Syamala, S. Devanathan and V. Ramamurthy, *J. Photochem.*, *34*, 219, **1986**.

Chemistry in Cavities.

G. Dasaratha Reddy, M. S. Syamala, B. Nageswar Rao and V. Ramamurthy, *Current Science*, *55*, 875, **1986**.

Organic Photochemistry in Organized Media.

V. Ramamurthy, *Tetrahedron*, *42*, 5753, **1986**.

Modification of photochemical reactivity by cyclodextrin complexation: Consequence of restricted rotation of Norrish type II 1,4-biradicals from arylalkyl ketones

G. Dasaratha Reddy, B. Jayasree and V. Ramamurthy, *J. Org. Chem.*, 52, 3107, **1987**.

Modification of photochemical reactivity by cyclodextrin complexation: Difference in photobehavior between short chain and long chain benzoin alkyl ethers—conformational effect.

G. Dasaratha Reddy and V. Ramamurthy, *J. Org. Chem.*, 52, 3952, **1987**.

Modification of photochemical reactivity by cyclodextrin complexation: A remarkable effect on the photobehavior of  $\alpha$ -alkyldibenzyl ketones.

B. Nageswer Rao, M. S. Syamala, N. J. Turro and V. Ramamurthy, *J. Org. Chem.*, 52, 5517, **1987**.

Modification of photochemical reactivity by cyclodextrin complexation: Alteration of the photochemical behavior via restriction of translational and rotational motions—alkyldeoxybenzoin.

G. Dasaratha Reddy and V. Ramamurthy, *J. Org. Chem.*, 52, 5521, **1987**.

Modification of photochemical reactivity by cyclodextrin complexation: Selectivity in photo-Claisen rearrangement.

M. S. Syamala and V. Ramamurthy, *Tetrahedron*, 44, 7223, **1988**.

Modification of photochemical reactivity by cyclodextrin complexation: Product selectivity in photo-Fries rearrangement.

M. S. Syamala, B. Nageswer Rao and V. Ramamurthy, *Tetrahedron*, 44, 7234, **1988**.

Photochemistry and Photophysics within Cyclodextrin Cavities

V. Ramamurthy and D. F. Eaton, *Acc. Chem. Res.*, 21, 300, **1988**.

Photoprocesses of Host–Guest Complexes in the Solid State.

V. Ramamurthy in *Photochemistry in Organized and Confined Media*, Ed., V. Ramamurthy, VCH Publishers, New York, 1991, p. 303.

Modification of photochemical reactivity on formation of inclusion complexes: Photorearrangement of benzyl phenyl ethers and methyl phenoxyacetates.

K. Pitchumani, S. Devanathan and V. Ramamurthy, *J. Photochem. Photobiol. A: Chem.*, 69, 201, **1992**.

Asymmetric Induction with Cyclodextrins: Photocyclization of Tropone Alkyl ethers.

S. Koodenjeri, A. Joy and V. Ramamurthy, *Tetrahedron*, **2000**, 56, 7003.

Asymmetric Induction with  $\alpha$ -Cyclodextrin: *Cis-trans* Isomerization of Diphenylcyclo-propane and its Derivatives,

S. Koodenjeri, S. Jayaraman, A. Pradhan and V. Ramamurthy, *Proc. Indian. Natl Acad. Sci: Chemical Sci*, **2002**, 68A, 453.

Cyclodextrin Mediated Enantio and Diastereo Selective Geometric Photoisomerization of Diphenylcyclopropane and Its Derivatives

Smriti Koodanjeri and V. Ramamurthy, *Tetrahedron Letters*, **2002**,43, 9229.

Cyclodextrin Mediated Solvent-Free Enantioselective Photocyclization of N-Alkyl Pyridones

J. Shailaja, S. Karthikeyan and V. Ramamurthy, *Tetrahedron Letters*, **2002**,43, 9335.

Cyclodextrin Mediated Regioselective Photo-Fries Reaction of 1-Naphthyl Phenyl Acylates

S. Koodanjeri, A. R. Pradhan, L. S. Kaanumalle and V. Ramamurthy, *Tetrahedron Letters*, **2003**, 44, 3207.

Templating Photodimerization of *trans*-Cinnamic acids with Cucurbit[8]uril and  $\alpha$ -Cyclodextrin

M. Pattabiraman, A. Natarajan, L. S. Kaanumalle and V. Ramamurthy, *Organic Letters*, **2005**, 7, 529-532.

Self-Assembled Coordination Cage as a Reaction Vessel: Triplet Sensitized [2+2] Photodimerization of Acenaphthylene, and [4+4] Photodimerization of 9-Anthraldehyde.

S. Karthikeyan and V. Ramamurthy, *Tetrahedron Letters*, **2005**, 46, 4495-4498.

A latent photoreaction predominates within water soluble calixarenes: Photochemistry of benzoin alkyl ethers

R. Kaliappan, L. S. Kaanumalle and V. Ramamurthy, *Chem. Commun.* **2005**, 4056-4058.

Template directed photodimerization of *trans* 1,2-bis(*n*-pyridyl)-ethylenes and stilbazoles in water.

M. Pattabiraman, A. Natarajan, R. Kaliappan, J. T. Mague and V. Ramamurthy, *Chem. Commun.* **2005**, 4542-4544.

Bioinspired-Green-Supramolecular-Nano Photochemistry: Photoproducts Control Through Weak Intermolecular Forces

L. S. Kaanumalle, A. Natarajan, K. Sivasubramanian, R. Kaliappan, M. Pattabiraman and V. Ramamurthy, *Spectrum*, **2006**, 19, 16-21.

Templating Photodimerization of Stilbazoles Within Water-soluble Calixarenes

R. Kaliappan, L. S. Kaanumalle, A. Natarajan, and V. Ramamurthy, *Photochem. Photobiol. Sci.*, **2006**, 5, 925 - 930.

Templating Photodimerization of Coumarins Within a Water Soluble Nano Reaction-Vessels

S. Karthikeyan and V. Ramamurthy, *J. Org. Chem.*, **2006**, 71, 6409-6413.

Regioselective Photodimerization of Cinnamic Acids In Water: Templatation with Cucurbiturils

M. Pattabiraman, L. S. Kaanumalle, A. Natarajan and V. Ramamurthy, *Langmuir*, **2006**, *22*, 7605-7609.

A Latent Photoreaction Enhanced Upon Cyclodextrin Encapsulation: Photochemistry of  $\alpha$ -Alkyl dibenzyl ketones in Water

S. Arumugam, L. S. Kaanumalle and V. Ramamurthy, *J. Photochem. Photobiol. A*, **2007**, *185*, 364-370.

Templating Photodimerization of *trans*-Cinnamic Acid Esters with a Water Soluble Pd nanocage

S. Karthikeyan and V. Ramamurthy, *J. Org. Chem.*, **2007**, *72*, 452-458.

Pre-orientation of olefins towards a single photodimer: Cucurbituril mediated photodimerization of protonated azastilbenes in water

M. V. S. N. Maddipatla, L. S. Kaanumalle, A. Natarajan, M. Pattabiraman and V. Ramamurthy, *Langmuir*, **2007**, *23*, 7545-7554.

Crystal engineering principles applied to solution photochemistry: controlling the photodimerization of stilbazolium salts within  $\alpha$ -cyclodextrin and cucurbituril[8] in water

R. Kaliappan, Murthy V. S. N. Maddipatla, L. S. Kaanumalle and V. Ramamurthy, *Photochem. Photobiol. Sci.*, **2007**, *6*, 737-740.

Sulfonatocalix[8]arene as a Potential Reaction Cavity: Photo- and Electro-active Dicationic Guests Arrest Conformational Equilibrium,

Raja Kaliappan, Yonghua, Ling, Angel E. Kaifer and V. Ramamurthy, *Langmuir*, **2009**, *25*, 8982-8992

Controlling photoreactions with confinement: Photochemistry of benzoin alkyl ethers within water soluble *p*-sulfonato calix[n]arenes

Raja Kaliappan and V. Ramamurthy, *J. Photochem. Photobiology A* (Inoue special issue), **2009**, *207*, 32-37.

Self Aggregation of Supramolecules of Nitroxides@Cucurbit[8]uril Revealed by EPR Spectra, N. Jayaraj,

M. Porel, M. F. Ottaviani, M. V. S. N. Maddipatla, A. Modelli, J. P. Da Silva, B. R. Bhogala, B. Captain, S. Jockusch, N. J. Turro and V. Ramamurthy, *Langmuir*, **2009**, *25*, 13820-13832.

Chiral Photochemistry within Natural and Functionalized Cyclodextrins: Chiral Induction in Photocyclization Products from Carbonyl Compounds

Raja Kaliappan and V. Ramamurthy, *J. Photochem. Photobiology A* (Inoue special issue), **2009**, *207*, 144-152.

Closed nanocontainer enables thioketones to phosphoresce at room temperature in aqueous solution

N. Jayaraj, M. V. S. N. Maddipatla, R. Prabhakar, S. Jockusch, N. J. Turro and V. Ramamurthy, *J. Phys. Chem. B*, **2010**, *114*, 14320

- Suppression of spin-spin coupling in nitroxyl biradicals by supramolecular host-guest interactions  
M. Porel, M. F. Ottaviani, S. Jockusch, N. Jayaraj, N. J. Turro and V. Ramamurthy, *Chem. Comm.* **2010**, *46*, 7736-7738.
- Aggregates of cucurbituril complexes in the gas phase  
J. Da Silva, N. Jayaraj, S. Jockusch, Steffen; N. J. Turro and V. Ramamurthy, *Org. Letters*, **2011**, *13*, 2410-2413.
- Chemistry in Restricted Spaces: Select Photodimerizations in Cages, Cavities and Capsules  
V. Ramamurthy and A. Parthasarathy, *Israel. J. Chem.*, **2011**, *51*, 817-829.
- Cucurbituril Adamantanediazirine Complexes and Consequential Carbene Chemistry  
S. Gupta, R. Choudhury, D. Krois, U. H. Brinker and V. Ramamurthy, *J. Org. Chem.*, **2012**, *77*, 5150–5160.
- Regioselective photodimerization of pyridyl-butadienes within cucurbit[8]uril cavities.  
M. V. S. N. Maddipatla, M. Pattabiraman, A. Natarajan, K. Srivastav, J. T. Mague, V. Ramamurthy, *Org. Biomol. Chem.*, **2012**, *10*, 9219-9222.
- Control of spin-spin exchange interactions in polynitroxides through inclusion within  $\alpha$ -cyclodextrin,  
M. Porel, M. F. Ottaviani, S. Jockusch, N. J. Turro and V. Ramamurthy, *RSC Advances*, **2013**, *3*, 427.
- Synthetic versus Natural Receptors: Supramolecular Control of Chemical Sensing in Fish  
José P. Da Silva, R. Choudhury, M. Porel, U. Pischel, S. Jockusch, P. C. Hubbard, V. Ramamurthy, A. V. M. Canário, *ACS Chemical Biology*, **2014**, *9*, 1432-1436.
- Identification of Guest–Host Inclusion Complexes in the Gas Phase by Electrospray Ionization–Mass Spectrometry  
D. C. Mendes, V. Ramamurthy and J. P. Da Silva, *J. Chem. Edu.*, **2015**, *92*, 1091-1094.
- pH Induced cucurbit[7]uril hydrogels: Understanding microenvironment of the aggregates through excited state reactivity of dibenzyl ketones  
M. Pattabiraman, M. V. S. N. Maddipatla, and V. Ramamurthy, *J. Photochemistry and Photobiology A: Chemistry*, **2016**, *324*, 53-61.
- ESI-MS of cucurbituril complexes under negative ESI  
Maria A. A. Rodrigues, Débora C. Mendes, V. Ramamurthy and José P. Da Silva, *J. Am. Soc. Mass Spectrom.*, **2017**, *28*, 2508-2514.
- Competitive binding of organic dyes between cucurbiturils and octaacid  
S. Gupta, Y. Zhao, R. Varadharajan and V. Ramamurthy, *ACS Omega*, **2018**, *3*, 5083-5091.

Modulation of Reduction Potentials of Bis(pyridinium)alkane Dications Through Encapsulation Within Cucurbit[7]uril

N. A. Tcyrulnikov, R. Varadharajan, A. A. Tikhomirova, M. Pattabiraman, V. Ramamurthy, and R. M. Wilson, *J. Org. Chem.* **2019**, *84*, 8759–8765.