

BHABHA ATOMIC RESEARCH CENTRE
RADIATION & PHOTOCHEMISTRY DIVISION

PUBLICATIONS 2009

(A) Journals (Published)

1. Control on the Supramolecular Excimer Formation of Thioflavin T within a Cucurbit[8]uril Host: A Fluorescence on/off Mechanism
J. Mohanty, S. Dutta Choudhury, H. P. Upadhyaya, A. C. Bhasikuttan and H. Pal
Chem. Eur. J., 15 (2009) 5215-5219
2. Modulation of Excited-State Proton Transfer of 2-(2'-Hydroxyphenyl)benzimidazole in a Macrocyclic Cucurbit[7]uril Host Cavity: Dual Emission Behavior and pK_a Shift.
S. Mhejabeen, S. Dutta Choudhury, J. Mohanty, A. C. Bhasikuttan, W. M. Nau and H. Pal
Chem. Euro. J. 15 (2009) 12362-12370.
3. Photophysics, Photochemistry and Photobiology of Curcumin: Studies from organic solutions, bio-mimetics and living cells
K. I. Priyadarsini
J. Photochem. Photobiol., C: Chemistry Reviews 10 (2009) 81-96
4. Efficient Luminescence and Photocatalytic Behavior in Ultrafine TiO₂ Particles synthesized by Arrested Precipitation
K. Sreejith and H. N. Ghosh
Journal of Material Chemistry 19 (2009) 3523 – 3528
5. Ruthenium(II) complexes of bipyridine-glycoluril and their interactions with DNA
M. S. Deshpande, A. A. Kumbhar, A. S. Kumbhar, M. Kumbhakar, H. Pal, V. G. Puranik, U. B. Sonawane and R. R. Joshi
Bioconjugate Chem. 20 (2009) 447.
6. Modulation in the solute location in block copolymer-surfactant supramolecular assembly: A time resolved fluorescence study
P. K. Singh, M. Kumbhakar, H. Pal and S. Nath
J. Phys. Chem. B 113 (2009) 1353.

7. Photophysical studies on the non-covalent interaction of thioflavin T with cucurbit[n]uril macrocycles
S. Dutta Choudhury, J. Mohanty, H. P. Upadhyaya, A. C. Bhasikuttan and H. Pal
J. Phys. Chem. B 113 (2009) 1891.
8. Fluorescence spectroscopic investigation to identify the micelle to gel transition of aqueous triblock copolymer solutions
S. George, M. Kumbhakar, P. K. Singh, R. Ganguly, S. Nath and H. Pal
J. Phys. Chem. B 113 (2009) 5117
9. Modulation of excited state proton transfer reactions of 7-hydroxy-4-methylcoumarin in ionic and nonionic reverse micelles
S. Dutta Choudhury, H. Pal,
J. Phys. Chem. B, 113 (2009) 6736-6744.
10. Novel reactions of one-electron oxidized radicals of selenomethionine in comparison with methionine
B. Mishra, A. Sharma, S. Naumov, K. I. Priyadarsini
J. Phys. Chem. B 113 (2009) 7709–7715
11. Ultrafast torsional dynamics of protein binding dye, thioflavin T, in nanoconfined water pool
P. K. Singh, M. Kumbhakar, H. Pal, S. Nath
J. Phys. Chem. B 113 (2009) 8532-8538
12. Time dependent growth of the block copolymer P123 micelles near cloud point: Employing heat cycling as a tool to form kinetically stable worm-like micelles
R. Ganguly, M. Kumbhakar, and V. K. Aswal
J. Phys. Chem. B. 113 (2009) 9441-9446
13. Time dependent sphere-to-rod growth of the pluronic micelles: Investigating the role of core and corona solvation in determining the micellar growth rate.
Kadam, Y., Ganguly, R., Kumbhakar, M., Aswal, V.K., Hassan, P.A., Bahadur, P.
J. Phys. Chem. B. 113 (2009), 16296-16302
14. Interfacial electron transfer dynamics in Quinizarin sensitized ZnS nanoparticle: Monitoring charge transfer emission
S. Rawalekar, S. Verma, K. Sreejith and H. N. Ghosh
Langmuir 25 (2009) 3168.

15. Structural phase behavior and vibrational spectroscopic studies of biofunctionalized CdS nanoparticles
P. Thakur, S. S. Joshi, S. Kapoor, and T. Mukherjee
Langmuir 25 (2009) 6334-6340
16. Fluorescence behavior of cysteine-mediated Ag@cdS nanocolloids
P. Thakur, S. S. Joshi, S. Kapoor, and T. Mukherjee
Langmuir 25 (2009) 6377-6384
17. Single-molecule fluorescence studies reveal long-range electron-transfer dynamics through double stranded DNA
M. Kumbhakar, A. Kiel, H. Pal and D. P. Herten
ChemPhysChem (Communication), 10 (2009) 629.
18. Influence of confined water on the photophysics of dissolved solutes in reverse micelles.
A. K. Satpati, M. Kumbhakar, S. Nath and H. Pal
ChemPhysChem 10 (2009) 2966-2978.
19. Ultrafast Relaxation Dynamics of the Excited States of 1-Amino- and 1-(N,N-Dimethylamino)-fluoren-9-ones
Mahendra Varne, Vaishali Samant, Jahur A. Mondal, Sandip K. Nayak, Hirendra N. Ghosh, Dipak K. Palit
ChemPhysChem, 10 (2009) 2979-2994.
20. The Role of Hydrogen-Bonding Interactions in the Ultrafast Relaxation Dynamics of the Excited States of 3- and 4-Aminofluoren-9-ones
Jahur A. Mondal, Vaishali Samant, Mahendra Varne, Ajay K. Singh, Tapan K. Ghanty, Hirendra N. Ghosh, Dipak K. Palit
ChemPhysChem, 10 (2009) 2995-3012.
21. Evidence of multiple electron injection and slow back electron transfer in Alizarin sensitized TiO₂ particle
K. Sreejith, S. Verma, J. A. Mandal, D. K. Palit and H. N. Ghosh
J. Phys. Chem. C 113 (2009) 3593.
22. Adsorption of methimazole on silver nanoparticles: FTIR, Raman, and surface-enhanced Raman scattering study aided by density functional theory
N. Biswas, S. Thomas, A. Sarkar, T. Mukherjee and S. Kapoor
J Phys. Chem C 113 (2009) 7091-7100.

23. Interfacial Electron Transfer Dynamics Involving a New Bis-thiocyanate Ruthenium (II)-polypyridyl Complex, Coupled Strongly to Nanocrystalline TiO₂, Through a Pendant Catecholate Functionality
P. Kar, S. Verma, A. Das, H. N. Ghosh
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24. Do the interfacial fluidities of cationic reverse micelles enhance with an increase in the water content?
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25. Liquefied petroleum gas (LPG) sensing performance of electron beam irradiated chemically deposited TiO₂ thin films
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Sensors and Actuators, B: Chemical 141 (2009), pp. 58-64
26. Antioxidant activity and free radical scavenging reactions of hydroxybenzyl alcohols: Biochemical and pulse radiolysis studies
S. B. Dhiman, J. P. Kamat and D. B. Naik
Chemico-Biological Interactions 182 (2009) 119-127
27. Reactions of hydroxyl radical with bergenin, a natural poly phenol studied by pulse radiolysis
U. Singh, A. Barik and K. I. Priyadarsini
Bioorg. Med. Chem. 17 (2009) 6008-6014
28. Theoretical and Experimental Studies of the Reactions between Hyperthermal O(³P) and Graphite: Graphene-Based Direct Dynamics and Beam-Surface Scattering Approaches
Jeffrey T. Paci, Hari P. Upadhyaya, Jianming Zhang, George C. Schatz and Timothy K. Minton
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29. Monomer and Dimer Radical Cations of Benzene, Toluene, and Naphthalene
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J. Phys. Chem. A, 113 (2009), 6489-6493.
30. Oxidation of Tryptamine and 5- Hydroxytryptamine: A Pulse Radiolysis and Quantum Chemical Study
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J. Phys. Chem., A 113 (2009) 8249-8257.

31. Photodissociation of 3-bromo-1,1,1-trifluoro-2-propanol at 193 nm: Laser induced fluorescence detection of OH($v''=0, J''$)
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32. Distinctive IR Signature of CO₃⁻ and CO₃²⁻ Hydrated Clusters: A Theoretical Study
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34. Influence of urea N-H acidity on receptor-anionic and neutral analyte binding in a ruthenium(II)-polypyridyl-based colorimetric sensor
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35. Ficus racemosa Stem Bark Extract: A Potent Antioxidant and a Probable Natural Radioprotector
V. P. Veerapur, K. R. Prabhakar, V.K. Parihar¹, M.K. Reddy, S. Ramakrishana, B. Mishra, B. S. Satish Rao, K. K. Srinivasan, K. I. Priyadarsini and M. K. Unnikrishnan
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36. Phase-transfer and film formation of silver nanoparticles
Anjana Sarkar, Ridhima Chadha, Nandita Biswas, Tulsi Mukherjee, Sudhir Kapoor,
Journal of Colloid and Interface Science 332 (2009) 224–230.
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38. Sensitization of TiO₂ Nanoparticles in Microemulsion by Photoexcited Dye Molecules: A Femtosecond Transient Absorption Study
M. C. Rath, D. K. Palit, T. Mukherjee and H. N. Ghosh
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Ravi Joshi, Tapan K. Ghanty, Sergej Naumov and Tulsı Mukherjee
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40. Oxidation and magnetic properties of lead nanoparticles in different matrices
A. Sarkar, R. Chadha, T. Mukherjee and S. Kapoor
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41. Probing the adsorption mechanism in thiamazole bound to the silver surface with surface-enhanced Raman scattering and DFT
N. Biswas, S. Thomas, A. Sarkar, T. Mukherjee and S. Kapoor
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42. Photophysical properties of coumarin-7 dye: Role of twisted intramolecular charge transfer state in high polarity protic solvents
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43. Host-guest interaction of 1,4-dihydroxy-9,10-anthraquinone dye (quinizarin) with cyclodextrins
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Photochem. Photobiol. Sci. 8 (2009) 82-90.
44. Electron beam irradiation induced transformations in the electro-optical and dielectric properties of a twisted-nematic display material 4'-pentyl-4-cyanobiphenyl (5CB)
R. Verma, R. Dhar, R. Dabrowski, M. Tykarska, V. K. Wadhawan, M. C. Rath, S. K. Sarkar
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46. In vitro radioprotection studies of organoselenium compounds: differences between mono- and diselenides
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Ravi Joshi, Tapan K. Ghanty and Tulsi Mukherjee
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49. Characterization of electrodeposited Bi₂S₃ thin films by holographic interferometry
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Teena Goel, Chandra N. Patra, Swapan K. Ghosh and Tulsi Mukherjee
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51. Estimation of aroma precursors in radiation processed fenugreek
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S. B. Dhiman and D. B. Naik
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55. Beam-Surface Scattering Studies of the Individual and Combined Effects of VUV Radiation and Hyperthermal O, O₂, or Ar on FEP Teflon Surfaces
Amy L. Brunsvold, Jianming Zhang, Hari P. Upadhyaya, and Timothy K. Minton
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57. Crystal Structure of 2,2'-Diselenobis(acetic acid)
A. S. Hodage, P. P. Phadnis, A. Wadawale, K. I. Priyadarsini, V. K. Jain
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58. Studies of the individual and combined effects of VUV radiation and hyperthermal O or Ar atoms on FEP Teflon® and PMMA surfaces
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A.K. Mitra, V.B. Gawandi, K. George, H. Mohan and T. Mukherjee
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(B) Patents

1. Photostabilisation of Fluorescent Dyes.
W. M. Nau and J. Mohanty
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(C) Books*

1. Effect of H-bonding on the photophysical behavior of coumarin dyes; in "Excited-State Hydrogen Bonding and Hydrogen Transfer."
S. Nath, M. Kumbhakar and H. Pal
Book edited by, Ke-Li Han and Guang-Jiu Zhao, Vol. I, John Wiley
2. Radiation Induced Free Radical Chemistry in Homo & Heterogeneous Media, G.R. Dey (Eds),
Research Signpost, Kerala, India, ISBN: 978-81-308-0270-1 released in 2009
Contributions from RPCD
 - (i) Radiation induced redox chemistry in aqueous-H₂SO₄ solvent
Tomi Nath Das, pp 39-65
 - (ii) Pulse radiolysis studies on one-electron oxidation of organo-selenium compounds
K. Indira Priyadarsini and B. Mishra, pp 67-80
 - (iii) Investigation of kinetics and mechanism of free radical reactions: Role of radiation chemistry in biology and medicine
Ravi Joshi, pp 97-108
 - (iv) Free radical reactions of folic acid: A short review
S. Adhikari, S. Chattopadhyay, and T. Mukherjee, pp 109-117
 - (v) Pulse radiolysis of pyridine and quinoline derivatives in aqueous solutions: Radical adduct and dimer radical formation reactions
D.B. Naik, pp 119-142
 - (vi) Generation and kinetic studies of gold nanoparticles in absence and presence of copper ions in 2-propanol following radiation induced free radicals reactions
G.R. Dey, pp 159 - 171
3. Radiolytic preparation and catalytic reactions of platinum nanoparticles
Sudhir Kapoor, Ridhima Chadha, Tulsi Mukherjee
In: New Nanotechniques, Eds. A. Malik and R. J. Rawat, Ch. 15, 2009

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(D) Scientific Bulletin*

1. Rotational diffusion in a room temperature ionic liquid: The role of specific interactions
K. S. Mali
ISRAPS Bulletin, Vol 21 (1), 2009
2. Pulse Radiolysis Study in Picosecond Time-domain
Dipak K. Palit
ISRAPS Bulletin Vol. 21, Number 2&3 October 2009, 4-11
1. Molecular Beam-Resonance Enhanced Multiphoton Ionization: Basic Concepts and Instrumentation
P.D. Naik, H.P. Upadhyaya and Awadhesh Kumar and P.N. Bajaj
ISRAPS Bulletin Vol. 21, Number 2&3 October 2009, 12-21
4. Coherent Control Technologies and its Applications
Ajay K. Singh and Sisir K. Sarkar
ISRAPS Bulletin Vol. 21, Number 2&3 October 2009, 22-31

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(E) BARC Reports*

1. Preparation of organoselenium compounds
S. Dey, N. Ghavale, A. S. Hodage, V. K. Jain, G. Kedarnath, L. B. Kumbhare, P. P. Phadnis, Parashiva Prabhu C., A.Wadawale and K. I. Priyadarsini
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2. Development of resonance-enhanced multiphoton ionization system
P.D. Naik, H.P. Upadhyaya, Awadhesh Kumar, P.N. Bajaj, A.K. Sinha, S. Bhatt and M.D.P. Gupta
BARC Report No.: BARC/2009/E/011
3. Femtosecond fluorescence up-conversion: a time-gated frequency mixing technique for ultrafast chemical dynamics.
P. K. Singh, M. Kumbhakar, J. Mohanty, S. Nath, A. C. Bhasikuttan, H. Pal, S. K. Sarkar and T. Mukherjee
BARC Report, E-1843, 2009, 1-21.

4. Development of a quadruple mass spectrometer based system for resonance mass spectrometry and wavelength acquisition in atomic vapour laser isotope separation

P. N. Bajaj, Radiation & Photochemistry Division

R. C. Das, N. Vishnu Kumar, D. K. Rathod and K. G. Manohar

Laser & Plasma Technology Division

BARC/2009/R/005

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