



European Photochemistry Association

NEWSLETTER

December 2009

General information about the European Photochemistry Association

is available at:

www.photochemistry.eu

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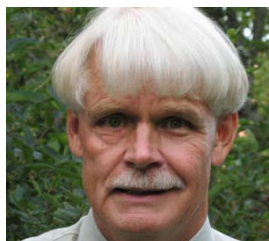
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EDITORIAL

President's Letter

At the end of this year I would like to mention three conferences in which our Association participates actively.

The Austrian Section continues with the tradition of organizing the Central European Conference on Photochemistry (CECP) every two years. It will take place next February at Bad Hofgastein (page 39) where the CECP Award for Young Scientists will be presented.

Ferrara will be the location of the XIII IUPAC Symposium on Photochemistry next July (page 34) and several important events will take place during this Symposium. The winner of the EPA Prize for the best thesis in Photochemistry, defended in 2008/2009, will present his/her work along with the EPA member whose article published in *Photochemical & Photobiological Sciences* has received the highest number of citations. At Ferrara, we will also hold our General Assembly at which I will present a report of the last three years' activities of the present Executive Committee and then, a new President and new Committee will be elected according to the EPA statutes (page 8). Therefore, I invite those amongst you who are willing to promote photochemistry by serving on the EPA Executive Committee to contact me by the end of April.

Closely associated to the IUPAC Symposium, a satellite conference dedicated to Giacomo Giamician and Emanuele Paternò will also take place. At this Symposium, the very essence of our discipline will be discussed; starting from its birth, continuing with future openings and tackling the way that our research becomes known to the wider public. This event will be followed by a themed issue of the *Photochemical & Photobiological Sciences* entitled "Photosciences, a look into the future".

In all three conferences, EPA members are entitled to reduced registration fees. In addition, in order to facilitate networking amongst the members of our Association, we will organize a reception for all EPA members at the IUPAC symposium in Ferrara. By paying your 2010 membership fee as early as possible (page 44) you will benefit from these facilities and, most importantly, support new EPA activities.

Dimitra Markovitsi
EPA President

THE STATUTES OF THE EUROPEAN PHOTOCHEMISTRY ASSOCIATION

TITLE I: Name, Headquarters, Permanence and Objects

ARTICLE 1

- (a) An incorporated organisation under the name of the European Photochemistry Association (EPA) has been set up under the provisions of the Swiss law.
- (b) It is a permanent body.
- (c) Its headquarters are in Zürich.
- (d) In the event that EPA is disbanded, the remaining finances must ultimately be transferred to an organisation having the same or similar aims. A distribution of the funds among its members is excluded.

ARTICLE 2

- (a) The EPA is established to promote and encourage the international development of photochemistry and related subjects with special reference to European and neighbouring countries. The Association is concerned with all experimental and theoretical aspects of the interaction of light with molecular systems. These range from basic knowledge and practical know-how to applications in areas such as materials science, biology, medicine and the environment.
- (b) In particular, the aims to be pursued by EPA are:
 - (1) Promotion of co-operation between European photochemists in universities, research centres and industry through fostering international contacts and European exchange.
 - (2) Encouragement, stimulation and co-ordination of meetings in Europe.
 - (3) Educational activities including summer schools, workshops and incorporation of photochemistry into the curricula of universities.
 - (4) Promotion of photochemical literature.
 - (5) Promotion of photochemistry with funding agencies.
 - (6) Promotion of awareness of photochemistry and its applications to the wider public.

TITLE II: Membership

ARTICLE 3

- (a) Membership of EPA is open to all scientists both from Europe and from countries outside Europe.
- (b) Membership is annual and is subject to a fee as assessed by the Executive Committee and approved by the General Council. Membership fees must be paid according to the rules established by the Executive Committee.
- (c) It is the responsibility of the members to provide and maintain correct contact details, including email addresses. Changes should be notified to the General Treasurer.

(d) EPA members of a given country may organize, by agreement with the Executive Committee, a national EPA section with a designated national representative who serves as a contact person.

(e) A national section may lose its status upon the decision of the Executive Committee.

ARTICLE 4

Membership implies compliance with the decisions and resolutions made by the General Council and the Executive Committee as provided in the statutes

ARTICLE 5

Membership of EPA may be terminated at the request of the Executive Committee for just reason.

ARTICLE 6

Members are not personally liable for the contracted debts of the EPA; liability is limited to the assets of the association.

ARTICLE 7

The organs of the EPA are the General Council and the Executive Committee.

ARTICLE 8

(a) The General Council consists of all members of the EPA and is its supreme organ.

(b) The General Council has the following rights and functions:

- (1) To agree and to alter the statutes.
- (2) To decide about the amounts of the annual contributions (membership fees), following the proposal of the Executive Committee.
- (3) To vote on the annual reports of EPA activities and finances presented to it by the Executive Committee.
- (4) To elect biennially from among its ordinary members the Executive Committee.
- (5) To elect biennially two auditors who must prepare a report on the financial situation of EPA and ensure proper management of financial affairs by the Executive Committee.

(c) The General Council should meet at least biennially, usually in connection with an international scientific meeting, to discuss the agenda, which may be proposed by all members, to determine the general policy of EPA and to exercise its rights according to ARTICLE 8b. This meeting should be organised by the Executive Committee.

(d) At the request of 20% of all EPA members, an extraordinary meeting of the General Council must be organised, and at least three month's notice given, by the Executive Committee. Due provision must be made for those who can not attend the extraordinary

meeting of the General Council personally to express their opinion in writing and, if necessary, by postal or electronic vote.

(e) A resolution for winding-up or merger of EPA must be put to a meeting of the General Council, which if it agrees will instruct the Executive Committee to ballot all members of EPA. Such a resolution can only be passed by a majority of not less than two-thirds of the votes cast. In winding-up the General Council should decide whether to dispose of the balance of the assets of EPA to a similar scientific body.

ARTICLE 9

(a) The Executive Committee administers EPA.

(b) The Executive Committee consists of the President, the past-President, the Vice President, the General Treasurer and up to six other members who may be responsible of a specific function at the discretion of the President. Exceptionally, additional members can be co-opted by the Executive Committee to fulfil specific roles.

(c) The tasks of the Executive Committee include in particular:

- (1) The achievement of the aims of EPA as outlined in ARTICLE 2.
- (2) The management of the property of EPA including gifts and legacies left to EPA.
- (3) The preparation of an annual report on the activities of EPA and on the financial accounts which must be presented to the General Council together with an auditor's report.
- (4) The convening of the General Council and/or the individual consultation of the members in accordance with these statutes.
- (5) The execution of the decisions of the General Council.
- (6) The organisation of the biennial elections for the Executive Committee (as outlined in ARTICLE 9f).

(d) Formal decisions of the EPA require the signature of the President or, exceptionally, of the Vice-President in order to be binding. The President shall have power to delegate certain of his/her powers to other members of the Executive Committee.

(e) The term of office for an elected member of the Executive Committee is normally two years. Re-election is permitted up to a maximum of three consecutive terms.

(f) The Executive Committee organizes elections for its own succession

- (1) Elections take place normally by a show of hands at the General Council (or exceptionally, by electronic voting).
- (2) The candidate(s) for President must normally be a member of the Executive Committee in office.
- (3) The candidate(s) for President will present a program for the EPA's future activities and actions and for the efficient functioning of the Executive Committee.
- (4) Not less than one month prior to the election, the Executive Committee will publicise to EPA members the name(s) of the candidate(s) for President and their program(s).
- (5) Members may nominate themselves or other EPA members with their consent for election to the Executive Committee. Nominations should be made in writing,

signed by the nominee, to the Executive Committee any time up to one month prior to the General Council.

TITLE IV: Finances

ARTICLE 10

- (a) EPA is a non-profit making organisation.
- (b) The income of the EPA shall consist of:
 - (1) Contributions of members as assessed by the General Council.
 - (2) Contributions from governmental bodies or national scientific societies representing member countries.
 - (3) Gifts, donations, and legacies.
 - (4) Grants, which may be accorded to it.
 - (5) Royalties from publications.
 - (6) Revenues from advertisements in publications.

ARTICLE 11

- (a) A national section may hold an account to which EPA members pay their dues and where other official revenues and expenses are recorded.
- (b) The person in a national EPA section responsible for the finances may be the national Local Treasurer. Local Treasurers are appointed by the Executive Committee.
- (c) The Local Treasurer of a national EPA section sends a yearly report and justifications to the EPA General Treasurer. They transfer official revenues to the account of EPA International according to the requirements of the Executive Committee.

Porter Medal

The Porter Medal is awarded every two years to the scientist who, in the opinion of the European Photochemistry Association, the Inter-American Photochemistry Society, and the Asian and Oceanian Photochemistry Association, has contributed most to the subject of Photochemistry.

The Porter Medal, named for the late George Porter FRS, Nobel Laureate, is awarded biennially to the scientist who in the opinion of the judges, has contributed most to the science of photochemistry with particular emphasis on more physical aspects, reflecting George Porter's own interests.

The details of the nomination procedure can be found at <http://www.portermedal.com/> . The closing date for nomination is January 15, 2010.

EPA PhD Prize

The second EPA Prize will be attributed during the XXIIIrd IUPAC Symposium on Photochemistry which will be held in Ferrara, Italy in 2010. The awardee will present its work at the Symposium. The Prize is 1000 Euros, plus travel costs to Ferrara (within the limit of 300 €) and one free year of EPA membership.

The candidate must: have defended his/her PhD Thesis in 2008/2009, be nominated by an EPA member.

Deadline for nominations: December 31 2009.

Nominations should be sent (electronically only) to Eric Vauthey (eric.vauthey@unige.ch).

Nominations must include

- [1] a copy of the thesis
- [2] an abstract of thesis in English, no more than five pages
- [3] a list of publications arising from the thesis
- [4] a letter of support.

(see also http://www.photochemistry.eu/phd_price.php).

The Hammond Medal

The Hammond Medal: Description and Solicitation for its Endowment

A medal to honor the memory and contributions of George S. Hammond to the photosciences is being established, subject to reaching an adequate endowment. The Hammond Medal will be presented biennially to a scientist for lifelong achievement in any area of the photochemical sciences. The Awardee need not be a member of I-APS, and Porter Medalists and I-APS Award winners will be eligible; scientists from all parts of the world will be considered equally.

The Medal will be awarded biennially at an I-APS meeting in years that alternate with conferral of the Porter Medal. The Awardees will be requested to deliver a lecture as part of the presentation ceremony. The endowment will be administered in perpetuity by the Inter-American Photochemical Society (I-APS). Given the nature of the award, a minimum of US\$50K will be necessary to establish the award.

Donations to the endowment fund should be made payable to “I-APS Hammond Fund” and sent to the U. S. I-APS Treasurer:

William Jenks (USA)
Department of Chemistry
Iowa State University
1605 Gilman Hall
Ames, IA 50011-3111
wsjenks@iastate.edu

Grammaticas-Neumann Prize 2010

Call for Nominations

The Photochemistry Section of the Swiss Chemical Society (which acts as the Swiss section of the European Photochemistry Association, EPA) is pleased to invite nominations for the international Grammaticakis-Neumann Prize 2010. The Prize consists of a diploma and a financial award of 5'000 Swiss Francs (for each awardee, if there is more than one), and it is presented once a year to a young research scientist (<40 at the time when he or she receives the prize) from academia or from industry for outstanding contributions to the science of photochemistry. The Prize, for which nominations are now being invited, will be presented during the 2010 Fall Meeting of the Swiss Chemical Society. The award ceremony will be followed by a lecture of the laureate which is also to be published in the official EPA journal, *Photochemical and Photobiological Sciences*.

Each member of the EPA, or one of its sister organizations (such as the Inter-Amerkical Photochemical Society) can nominate an individual as candidate a for the Grammaticakis-Neumann Prize. Such nominations, accompanied by supporting documentation (detailed justification, curriculum vitae, list of publications, and at least two supporting letters), should be submitted by e-mail (with attachments) to the executive director of the Swiss Chemical Society, Dr. Lukas Weber (weber@scg.ch). The closing date for nominations is October 10, 2009 (see also www.scg.ch/awards/grammaticakis.html).

Previous laureates of the Grammaticakis-Neumann Prize are Alexander Heckel (2008), Alberto Credi (2007), Torsten Fiebig and Achim Wagenknecht (2006), Dario Bassani (2005), Johan Hofkens (2003), Nicola Armaroli (2001), Dirk Guldi (2000), Werner Nau and Eric Vauthey (1999), Axel Griesbeck (1997), Matthew Zimmt (1996). Luisa de Cola (1995), Pedro Aramendia (1994), Mark van der Auweraer (1992), V. Ramamurthy (1991), Wolfgang Rettig (1990), Martin Demuth (1987), Ian Gould and Anthony Harriman (1985).

In other years (e.g. in 2009) no prize was awarded, because no suitable candidate was proposed.

PERSONAL NEWS

Obituary: Peter J. Wagner**Peter J. Wagner Dies at 70**

Peter J. Wagner died on August 6, 2009 following a long struggle with cancer. Pete was born December 25, 1938, in Chicago, Illinois and was a graduate of Loyola Academy, where he was class valedictorian, and Loyola University from which he graduated Magna Cum Laude in 1960. Growing up in Wilmette, Pete developed a life-long passion for the game of golf, at which he excelled, and for the Chicago Cubs. Pete continued his education at Columbia University, where he conducted research on free radical chemistry under the direction of Cheves Walling. While at Columbia Pete married Mary Linda Kelly, a fellow graduate student. Pete and Mary then moved to Pasadena where Pete was a postdoc with George Hammond at Caltech.

Pete joined the faculty at Michigan State University in 1965 and spent his entire career there, save for sabbatical years at UCLA with Mostafa El-Sayed and the NRC in Ottawa, Canada with Tito Scaiano. He served for a decade as Associate Editor of JACS and was chair of the 1985 Gordon Research Conference on Organic Photochemistry. He was a frequent participant in I-APS Meetings, Gordon Conferences, and IUPAC Symposia. He was well known for his research on radical pair and biradical intermediates in photochemical reactions and was the recipient of the 2000 I-APS Award in Photochemistry. He was the co-author of over 150 papers from MSU and served as mentor for approximately 50 graduate students and 20 postdocs.

Pete will be remembered by his students, colleagues, and friends for his contagious enthusiasm, be it for chemistry, family, friends, or his many interests. In addition to golf and the Cubs, his interests included gardening, travel, and serving as a soccer referee and baseball umpire. Pete was preceded in death by his wife Mary and is survived by six children and a grandchild.

Fred Lewis
Evanston, Illinois
August 19, 2009

PERSONAL NEWS

Obituary: Jacques Jousset-Dubien

A creative leader in Photochemistry

Jacques Jousset-Dubien, one of the co-founders of EPA and active President from 1976 to 1979, died suddenly in May 2009, aged 81.

JJD has been a tireless and successful researcher. He received a tribute on occasion of his retirement in EPA Newsletter, March 1998, no 62, accompanied with an overview of his research activities and perceptive comments from Nick Turro and Dereck Bryce-Smith. Here, we want to underline his main accomplishments and the salient features of his personality.

After a Ph.D. thesis on magnetic properties of molecules, JJD discovered photochemistry as a postdoctoral fellow of G. Oster at New York Brooklyn Polytechnic Institute in 1957-1958. Photochemistry was at the moment an emerging science. Being appointed assistant professor at the University of Bordeaux in 1959, he started a research programme in this area with essentially three graduate students, namely Jean Faure, Robert Lesclaux and Roland Bonneau, who became well known scientists in their own fields. They were followed by many other students from Bordeaux and from various other places, attracted by the growing reputation of JJD: Michel Lamotte, Marc Ewald, Philippe Garrigues, Jean-Pierre Morand, Anne-Marie Merle, Gérard Dorthe, Christian Naulin, Bernard Veyret, Olivier Donnard..etc.as well as colleagues joining the group in 1974: Henri Bouas-Laurent, René Lapouyade, Alain Castellan, Jean-Pierre Desvergne. When JJD left the directorate, in 1984 (for administrative reasons), the laboratory represented more than eighty members divided up into six main activities: general physical chemistry and spectroscopy, flash photolysis, atmospheric photochemistry, marine photochemistry, molecular dynamics, organic photochemistry.

The main accomplishments of JJD are:

- Mechanism of dye photochemistry in aqueous solution, using flash photolysis and theoretical calculations (1960-1976).
- The first reliable measurement of the magnetic susceptibility of fluorescein in its phosphorescent state (1974); this critical experiment removed all doubt as to its triplet nature (recognized by Turro, Mc Glynn, Azumi...).
- The first introduction of a nanosecond flash laser in doing the first measurement of light absorption from the first excited singlet state (1968-1969).
- Biphotonic excitation to upper excited states of Polycyclic Aromatic Hydrocarbons (PAH) in boric acid glasses, leading to electron photoejection and production of stable PAH radical-cations at room temperature (1964-1966).
- Discovery of the twisted transoid form of phenylcycloalkenes resulting from UV irradiation of the stable cis form; this was followed by laser flash photolysis study solving the question of the so called "phantom triplet" (1976-1979).
- Experimental and theoretical investigation of the quasi linear structure of UV and fluorescence spectra of PAH molecules oriented in n-alkanes single crystals (1984-1989).

In parallel, JJD introduced environmental (air and water) studies in his laboratory; they were conducted by several groups devoted to atmospheric chemistry (Robert Lesclaux), and marine chemistry (Marc Ewald), followed by a development in analytical chemistry and

toxicology (Philippe Garrigues), with special emphasis on toxic elements traces in water (Olivier Donard).

Among the achievements of JJD, the organization of two international conferences should be underlined: the fifth International Conference on Photochemistry in 1971 (Bordeaux) & the ninth IUPAC Symposium on Organic Photochemistry in 1982 (Pau).

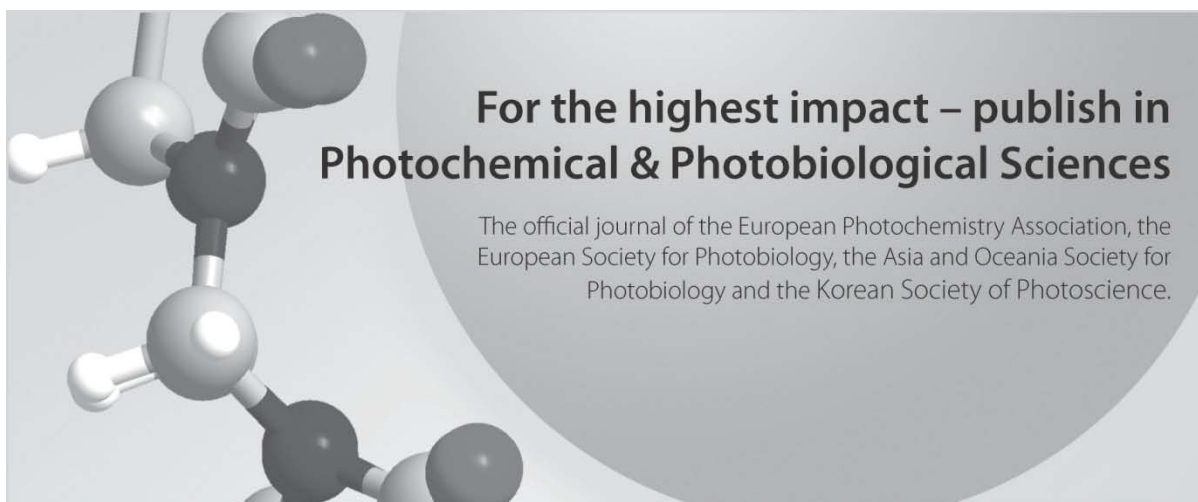
After several years devoted to the administration of research at the national level, JJD initiated a new research programme with Bernard Veyret (1988) in an entirely different field: the study of non thermal specific effects of magnetic and electromagnetic fields on living systems, named "Bioelectromagnetism". This laboratory is now worldwide established.

JJD was dedicated to research and proud to be a chemist. As a natural leader and hard worker, he was called to fulfil many national and international missions. Despite his administrative jobs, he has always remained in contact with the research going on in his own laboratory, making sure that this was at the forefront of the scientific progress. He was encouraging his coworkers to be dynamic and exchange their ideas with the best scientists in order to propose innovative projects. One of his constant concerns was to have his coworkers happy to come to the laboratory every day. He used to make himself available to each of them, showing much interest in their progress and concerns. In addition to his fantastic drive, kindness, humility and generosity were the hallmark of his personality. That is the main reason why he was beloved by all his coworkers and students. A considerable crowd, moved and contemplative, attended his funerals at Gradignan where a warm homage was paid to him.

Henri Bouas-Laurent



PHOTOCHEMICAL AND PHOTOBIOLOGICAL SCIENCES



For the highest impact – publish in Photochemical & Photobiological Sciences

The official journal of the European Photochemistry Association, the European Society for Photobiology, the Asia and Oceania Society for Photobiology and the Korean Society of Photoscience.

Photochemical & Photobiological Sciences (PPS) publishes high quality research on all aspects of photochemistry and photobiology, including elemental photochemical and photophysical processes, the interaction of light with living systems, environmental photochemistry, environmental photobiology, the use of light as a reagent, how light affects health, the use of light as a diagnostic tool and for curative purposes and areas in which light is a cost-effective catalyst.

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- Photosynthesis from molecular perspectives – towards future energy production
- Issue dedicated to Professor NJ Turro

PPS publishes high impact research, recent papers include:

- Triplet-relaxation microscopy with bunched pulsed excitation by G Donnert, C Eggeling and SW Hell
- Mimicking the antenna system of green plants by G Calzaferri and K Lutkouskaya
- Time-resolved fluorescence microscopy by K Suhling, PNW French and D Phillips
- Effects of solar UV radiation on aquatic ecosystems and interactions with climate change by DP Hader, HD Kumar, RC Smith *et al.*
- Milestones in the development of photodynamic therapy and fluorescence diagnosis by A Juzeniene, Q Peng and J Moan
- Combining intracellular and secreted bioluminescent reporter proteins for multicolor cell-based assays by E Michelini, L Cevenini, L Mezzanotte *et al.*

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PUBLICATIONS

Abstracts of Theses in Photochemistry

Serena Ciorba

Heteroatom and medium effects on the excited state relaxation (radiative and reactive) of styryl- and distyryl-benzenes

Dipartimento di Chimica, Università di Perugia, 06123 Perugia, Italy

Ph. D. Thesis (in English), February 2009

Research Advisors: Anna Spalletti, Ugo Mazzucato

This thesis work dealt with a study of the structural and medium effects on the properties of the lowest electronically excited states of some compounds bearing one or two isomerizable double bonds (styryl- and distyryl-benzene analogues containing N, S and O heteroatoms) in order to investigate the changes induced by the heteroatom on the competition between radiative, non-radiative and reactive deactivation processes, on the geometrical photoisomerization mechanism and on the role of conformational equilibria. The research faced four different research lines.

1,2-distyrylbenzene - The main line of the thesis has concerned the photophysics and the photoreaction mechanism of 1,2 distyrylbenzene analogues containing heteroatoms in the side or central rings.

The preliminary study on the EE isomers showed that the three heteroaromatic groups investigated (pyridine, thiophene and furan) have a noticeable quenching effect on the radiative decay channel with respect to the hydrocarbon. On the other hand, they display different effects on photoisomerization: the thienyl group produces only a small increase in reactivity, whereas the pyridyl group leads to an important decrease in the torsional energy barrier in S_1 , thus favouring isomerization, and the furyl group displays an opposite effect favouring internal conversion. The results on the ZE and ZZ isomers showed that the pyridyl and thienyl groups affect very little (slight decrease) the $ZE \rightarrow EE$ quantum yields whereas the photoreaction yield of the ZZ isomers is almost trebled with respect to the hydrocarbon.

The heteroatom effect in these non conjugated 1,2 compounds was found to be rather similar to that previously observed for the corresponding linearly-conjugated 1,4 compounds. In both series the photoisomerization of the *cis* compounds occurs by a unique adiabatic mechanism in the hydrocarbons whereas the heteroatoms cause a marked decrease of the adiabatic contribution to the overall isomerization yield of both ZE and ZZ. In both 1,4 and 1,2 compounds, the heteroatom produces also a drastic decrease in the emission yield of EE, compensated by increased ZE production, particularly for the pyridyl derivative. Moreover, the overall reactivity of ZE is little affected by the heteroatom whilst that of ZZ increases substantially, particularly towards ZE. An intramolecular migration of the excitation energy towards one of the ethenic isomerizable double bonds seems to be favoured and the rotation of the second double bond is found in the direction of EE only, but never in the opposite direction ("one-way").

The deep investigation carried out on the conformational equilibria (elongated species A, semi-compressed species B and compressed species C) of the three geometrical isomers of

1,2-distyrylbenzene, has shown that the conformers play a relevant role in the photoreactivity of these molecules. The EE isomer showed a very different photobehaviour compared to that of the cis isomers (ZE and ZZ). In fact, *EE*-1,2-distyrylbenzene, which exists in the ground state in the elongated geometry only, undergoes, under irradiation, the adiabatic ${}^1\text{EE}(\text{A})^* \rightarrow {}^1\text{EE}(\text{B})^* \rightarrow {}^1\text{EE}(\text{C})^*$ rotamer interconversion in the S_1 state in non-polar solvent, contrary to the generally valid principle stating that rotamer interconversion in the singlet excited states is not expected. On the other hand, in the case of the ZE and ZZ isomers, different rotamers are present in the S_0 state, which do not interconvert in the excited state, according to the principle above. These conformers are then responsible for the adiabatic rotamer-specific cis \rightarrow trans photoisomerization in S_1 . The kinetic treatment of this complicate photobehaviour has shown that: (i) the most stable rotamer of EE in the S_1 state is the compressed C conformer, which is adiabatically produced from ${}^1\text{EE}(\text{A})^*$ even at very low temperatures; (ii) the radiative process is the unique relaxation pathway of the three rotamers of EE below 140 K; (iii) the semi-compressed B rotamer of ZE and ZZ is responsible for the adiabatic cis \rightarrow trans photoisomerization with a quantum yield of almost 1 for the ZE(B) \rightarrow EE(B) process above 250 K and (iv) the $S_0 \leftarrow S_1$ internal conversion is a very fast process for ZZ and for the elongated A conformer of ZE. These results put in evidence that the competition between the horizontal relaxation pathways (conformational and/or geometrical adiabatic isomerization) and the vertical processes (fluorescence and internal conversion) markedly depends on the molecular structure. As a consequence, the temperature and the nature of the lowest excited singlet state of the rotamers are the most important factors in driving the relaxation processes towards the different torsional pathways.

Distyrylfurans and distyrylbenzofuran derivatives - A collaboration with a theoretical group of the Modena University (Prof. I. Baraldi) and an organic chemical group of the Zagreb University (Prof. M. Šindler-Kulyk) focalized our attention on the effects of the presence of furan groups in stilbene-like molecules. These compounds resulted of particular interest for potential application since their marked photostability is accompanied by very high fluorescence quantum yields. A combined theoretical and experimental investigation on distyrylfurans and distyrylbenzofurans led to a complete description of the spectral behaviour of these compounds. The most stable conformer of distyrylfurans was found to be the planar or quasi-planar *s-trans,s-trans* species. Interestingly, the conformer of 2,3-distyrylfurans reminded the conformation of a polyene, its absorption spectrum being very similar to that of 3-*cis*- α,ω -diphenylhexatriene. The fluorescence emission spectra and photophysics showed that the emitting state is the same as that reached by absorption, related to the 1^1B_u state of all-*trans* polyenes.

Also in a series of variously substituted distyrylbenzofurans, the most stable conformer is *s-trans,s-trans*, accompanied by a smaller amount of *s-cis,s-trans*. The UV-Vis absorption spectrum of the unsubstituted 2,3-distyrylbenzofuran has relevant analogies with 2,3-distyrylfuran. Even in this case the emitting state was found to be the same as that populated by absorption. Moreover, the fluorescence spectrum of the *p*-nitro-derivative was markedly sensitive to the solvent polarity, as expected on the base of the large increase of the dipole moment on excitation, as obtained by calculations. This increase was nicely confirmed by the analysis of the experimental fluorosolvatochromism, typical of intramolecular charge transfer in the excited state.

Aza-diarylethenes - Another collaboration with the organic chemical group of the Bergamo University (Prof. T. Caronna) allowed to collect detailed information on the effect of the nitrogen heteroatom in stilbene-like compounds. The results obtained have indicated that the relatively strong effect of the heteroatom on the radiative and reactive relaxation parameters, previously

found for mono-aza- and, even more, for di-azastilbenes (pyridyl derivatives), tends to decrease when the nitrogen is in two- or three-membered aryl groups, such as naphthalene and phenanthrene. A reduction of fluorescence and an increase of photoisomerization are always found in the presence of nitrogen but the effect becomes flat in the compounds with condensed rings. The nitrogen induces peculiar effects when it occupies positions favouring N \cdots H interactions that stabilize one component of the conformational equilibrium. When the intramolecular interactions are particularly strong in inert solvents, as in the case of 3,3-di-(isoquinolyl)ethene, the torsional process is practically forbidden and the excited E isomer decays by fluorescence and internal conversion.

Hetero-analogues of stilbene included within zeolite - A six-month stage at the Wyoming University (Prof. E. Clennan) allowed gaining a useful experience on the study of organic compounds included in zeolites. In the last part of the thesis period, such experience was applied to a preliminary study of the inclusion effect on the radiative relaxation of the host-guest system under irradiation. Preliminary results were obtained on the luminescence of some aza- and tio-stilbenes included in faujasite-type zeolites. The comparison of absorption and emission spectra recorded using commercial zeolites, containing Na⁺ cations, with those where Na⁺ was exchanged by a heavier cation, such as Tl⁺, allowed the phosphorescence spectra and lifetimes, at liquid nitrogen temperature, to be obtained. These results, which were not obtainable in organic solvents, even at low temperature, particularly for the aza-derivatives, are very promising and will be followed by further studies including the effect of the nanocavities on the photochemical behaviour.

Denis Svechkarev

Synthesis, spectral properties and proton phototransfer reaction in a series of new heterocyclic nitrogen-containing derivatives and analogs of 3-hydroxychromone

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PhD thesis, March 2009

Research Advisor: Prof. Andrey Doroshenko

Charge and proton transfer processes are widely spread in nature. Compounds for which these processes are characteristic are actively investigated for over 50 years. 3-Hydroxychromone (3HC) derivatives, which exhibit unique physico-chemical properties as a result of the excited-state intramolecular proton transfer (ESIPT) reaction in their molecules, are subjects of extensive scientific research in this domain. Dual-band emission spectra of these compounds became a basis for development of the novel method of fluorescent analysis – ratiometric detection. The main advantage of this approach is that it doesn't require the use of external standards and reference samples. This particularity can be decisive and crucial at analysis of biological objects. Years of investigations of various possibilities for the practical application of 3HC derivatives showed them to be capable of probing solvent polarity, viscosity, and proton donor or acceptor ability. These fluorescent dyes can also be used as polypeptide markers, as well as indicators and sensors in the studies of physico-chemical

properties of biological objects, for example, intracellular pH, surface electric potential of cell membranes and even for early detection of cell apoptosis.

In the past 10 years, the synthesis of 3HC derivatives with additional heterocyclic moieties was extensively developed. Thus, 3HC showing the most long-wavelength fluorescence and the highest quantum yields belong to this series of compounds. 3HC derivatives having heteroaromatic substituents in the position 2 can be considered also as systems with a potential possibility of the alternative Hydrogen bonds formation, and as a result – with a possible alternative excited state proton phototransfer pathway. This particularity opens new and rather intriguing page in the study of the ES IPT process photophysics, and also in the design of new multi-band fluorescent compounds - highly effective ratiometric probes with the increased number of data collecting channels.

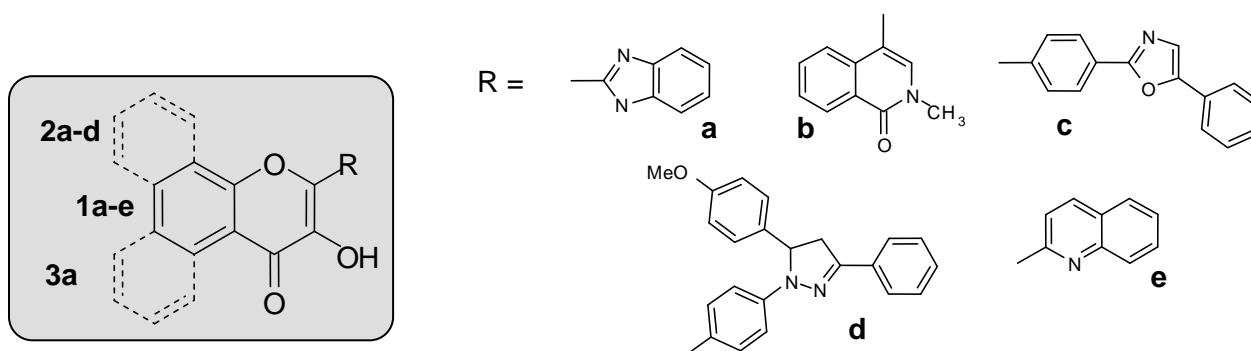


Figure 1. Heterocyclic 3-hydroxychromone under study.

In the present work, a series of the new heterocyclic nitrogen-containing derivatives and analogs of 3HC was synthesized (Fig. 1). In the investigated compounds, benzimidazole, N-methylisoquinolone, diphenyloxazole, triphenylpyrazoline and quinoline fragments were introduced in the position 2 of the parent chromone bicycle. Spectral and fluorescent properties of the title compounds, as well as their solvatochromism in a number of solvents of different nature, and also intramolecular proton transfer reaction in their excited states were investigated. Influence of the substituent nature on the spectral behavior of the 3HC derivatives under study was analyzed.

Combining the chromone bicycle with molecular fragments being known as effective fluorophores, is shown to result in the obtaining of the new highly effective multi-banded fluorescent dyes exhibiting excited-state intramolecular proton phototransfer. Contrary to such behavior, strong electron acceptor substituents in the position 2 lead to significant decrease of quantum yields of fluorescence. The same effect was observed upon annealing of the benzene ring to the parent chromone bicycle.

Our experiments proved that the proton phototransfer reaction is realized not only for the molecules with charge transfer directed from the substituent in the position 2 to the chromone bicycle, which is traditional for this family of compounds (Fig. 2, right), but also for the molecules exhibiting charge transfer in the opposite direction upon excitation (Fig. 2, left).

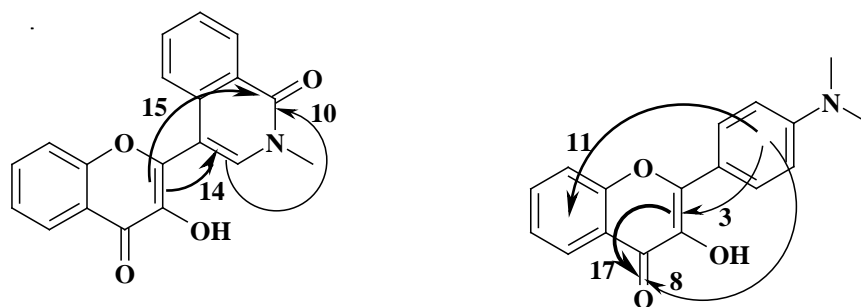


Figure 2. Electron density redistribution upon excitation in the molecules of **1b** (left) and 2-(4'-dimethylaminophenyl)-3-hydroxychromone (**DMAF**, right).

The nature of the intramolecular hydrogen bonds in the molecules of benzimidazole- and quinoline-substituted 3HC was investigated. Modeling of the possibility of an alternative intramolecular hydrogen bond formation, as well as realization of an alternative pathway for the excited-state intramolecular proton transfer reaction was effectuated. Presence of the alternative intramolecular hydrogen bonds to the nitrogen atom of the substituent's heterocycle was shown by X-ray structure analysis for both compounds in the crystalline state.

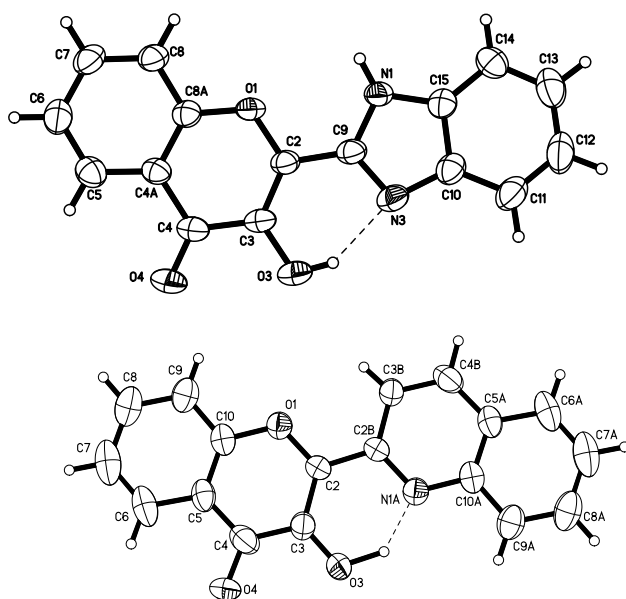


Figure 3. Structures of **1a** and **1e** in the crystalline state (XRD data).

The change of the proton transfer pathway from the “alternative” to the classical “flavonol-like” on going from crystalline state to solution was predicted for the benzimidazole-substituted derivative. At the same time, alternative H-bond appears to be stronger in the case of quinoline-substituted 3HC, thus keeping the proton transfer direction in solutions the same as in the crystalline state.

Spectral characteristics of the investigated compounds are sensitive to their environments polarity changes. This particularity make prospective to develop on their basis ratiometric fluorescent probes and sensors for various physico-chemical and medicobiological investigations. Thus, triphenylpyrazoline-substituted derivatives were shown to be useful for analysis of water or other polar admixtures in organic solvents, while

benzimidazole-substituted 3HC could be used for water-organic solvent systems analysis in the wide range of concentrations.

The obtained data allows deepening our understanding of the intramolecular proton transfer process photophysics and opening new ways for design of the new effective multi-band fluorescent probes with increased number of data collecting channels.

Gabriela Wiosna-Salyga

Phototautomerization in heteroazaaromatic systems

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PhD Thesis, 2009

Research advisor: Jacek Waluk

This work is devoted to ground and excited state processes induced by formation of intra- and intermolecular hydrogen bonds in a new class of heteroazaaromatic molecules represented by the series of three isomeric 7-(pyridyl)indoles, bifunctional molecules possessing both a proton donor (indole NH group) and an acceptor (pyridine-type nitrogen). In order to explore the ground and excited state structure of isolated and complexed chromophores as well as mechanisms, kinetics, and dynamics of the excited states deactivation processes the experiments in the condensed phase and in supersonic jets have been performed using a number of spectroscopic techniques supported by computational methods. The studied compounds differ in the relative position of the donor and the acceptor groups. As a consequence, they can form different types of hydrogen bonds. In all the selected compounds the HB donor and acceptor groups are located in separate parts linked by a single bond, which implies a possibility of conformational changes (*syn-anti* rotamerization) caused by specific interaction with protic solvents.

The results of experimental investigations (time-resolved fluorescence/absorption in solution and pump-probe photoionization in jets) allow to state that the *syn* form of 7-(2-pyridyl)indole, which possesses fairly strong intramolecular hydrogen bond, undergoes ultrafast excited state proton transfer along this bond (ESIPT). This process proceeds in a barrierless fashion and is coupled with mutual twisting of the pyridine and indole moieties. It results in an unusual finding that the reaction is slower in a condensed phase at room temperature than in the supersonic jet-isolated molecule (1 ps vs. about 300 fs). The phototautomer is efficiently deactivated by a radiationless channel which may be defined in terms of S_1/S_0 conical intersection along the proton transfer/twisting coordinate.

When the number of acceptor groups in the molecule is doubled (the case of 2,9-(di-2'-pyridyl)-4,7-di(*t*-butyl)carbazole) the ESIPT reaction becomes slower and takes about 5-10 ps in solution. The deuterium isotope effect has shown that tunneling contributes to phototautomerization. The deactivation of the phototautomer was found to be temperature- and viscosity-dependent, suggesting the important role of twisting about the bond linking the donor and acceptor moieties, similarly to the case of 7-(2-pyridyl)indole. However, in 2,9-(di-2'-pyridyl)-4,7-di(*t*-butyl)carbazole the photoreaction rate allows a distinction between two consecutive steps: proton transfer and twisting, which was impossible in 7-(2-pyridyl)indole because of an ultrafast rate of deactivation.

Moving the hydrogen-bonding centers one or two bonds away from each other results in drastic changes in the photophysics of 7-(pyridyl)indoles. The photophysics of 7-(3'-pyridyl)indole and 7-(4'-pyridyl)indole seem to be governed by specific and nonspecific interactions with the solvent. The fluorescence of both compounds is strongly quenched in alcohols, due to the appearance of an efficient nonradiative channel, most probably connected with internal conversion in intermolecularly hydrogen-bonded complexes. Additionally, the photophysics of 7-(3-pyridyl)indole is enriched by finding of co-existence of two different rotameric forms in polar solvents. The comparison of the IR/R2PI experimental data with DFT calculations revealed that 7-(3-pyridyl)indole tends to form cyclic structures even with one molecule of water. Besides the 1:1 complex, also a 1:2 cyclic species has been identified. These studies point to the tendency of 7-(3-pyridyl)indole to form the hydrogen bonds with geometric parameters deviating from those characteristic for a typical hydrogen bond.

Another result of this work is the observation of tendency of 7-(3'-pyridyl)indole and 7-(4'-pyridyl)indole to undergo conformational changes in the excited state as well as the difference in radiative rates observed between *n*-hexane and polar solvents, which shows that in the latter, a molecule, after excitation, becomes more twisted than in the ground state. On the other hand, the calculations for the isolated molecules predict more flat geometry in S_1 .

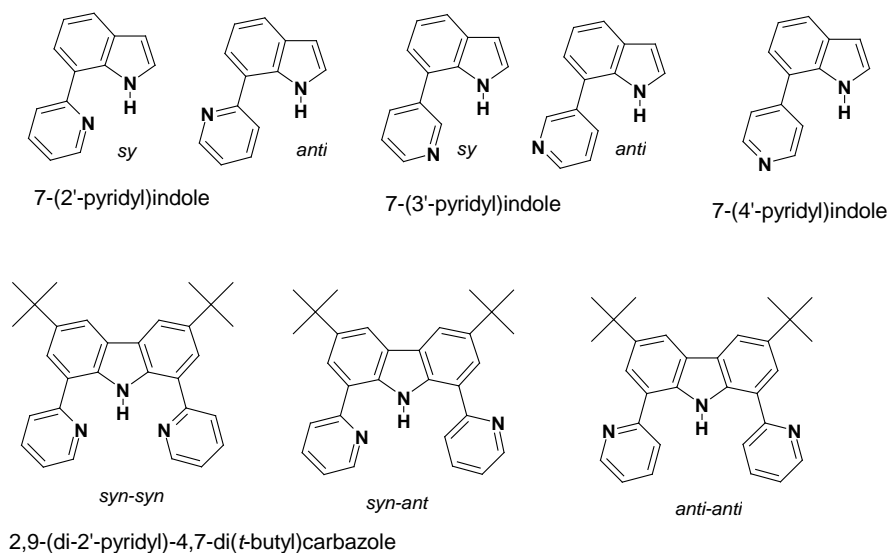


Figure 1. The molecules investigated in this work and their possible rotameric forms.

Romain Dagnelie

Development of chemical sensors based on nanoporous materials and optical transduction. Application to the detection of formaldehyde and aldehydes

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Ph.D. Thesis, October 2009, Saclay, France

Research Adviser: Dr Thu-Hoa TRAN-THI

During the last decade, the increase of the awareness of the importance of indoor air quality and its potential impact on human health has stimulated an interest in formaldehyde, a carcinogen for humans. Because of its numerous emission sources (plywood, isolation foam, adhesive resins, cosmetic, etc...), CH₂O is a ubiquitous indoor pollutant whose concentrations can vary from a few ppb to more than 100 ppb in homes. Over this domain of concentration, a few methods are commercially available, such as gas chromatography combined with a methanation process or the Hantzsch method involving the bubbling of the contaminated air in a liquid reactant. However, those sensors have a few drawbacks in terms either of simplicity of the sampling, heavy maintenance or high cost and high cost of consumables. Therefore, the development of a low-cost, fast and sensitive sensor which can detect a wide range of concentration of formaldehyde is an important and significant challenge.

The present thesis work was achieved in the “Chemical Sensors” team of the Francis Perrin Laboratory (LFP), a unit of the Atomic Energy Commission (CEA) associated with the National Centre of Scientific Research (CNRS). Various strategies were developed to obtain very sensitive and selective sensors with fast response time. A first selectivity is obtained with nanoporous SiO₂ materials, acting as a sponge to trap the pollutants and whose pore size distribution can be tailored to filter the pollutants by their size. These nanoporous materials were synthesized with tetramethoxysilane precursors (TMOS) using the Sol-Gel process. A second selectivity is obtained with the use of 4-amino-3-pentene-2-one (Fluoral-P), a probe molecule which absorbs in the UV and reacts selectively with formaldehyde to give the final 3,5-diacetyl-1,4-dihydrolutidine product (DDL). Unlike the reactants, DDL absorbs and fluoresces over the visible region (Figure 1) and therefore the detection of formaldehyde is based on the measurement of either DDL absorbance or fluorescence. To obtain a fast response time, very thin layers of the nanoporous matrice doped with Fluoral-P coated on quartz or glass substrates were used to allow a fast diffusion of the pollutant into the porous network.

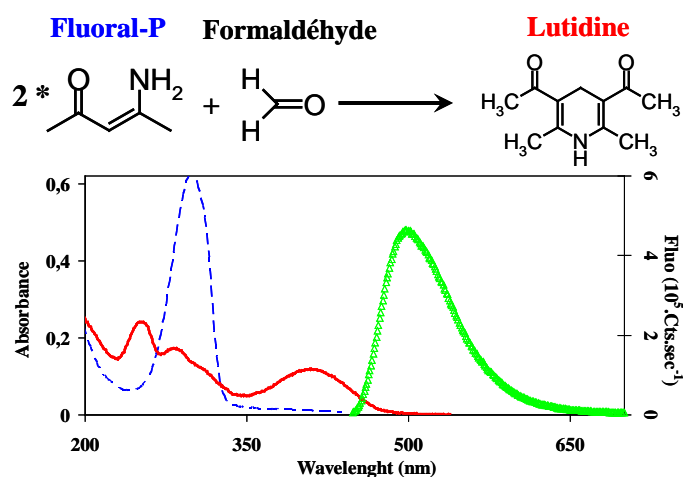
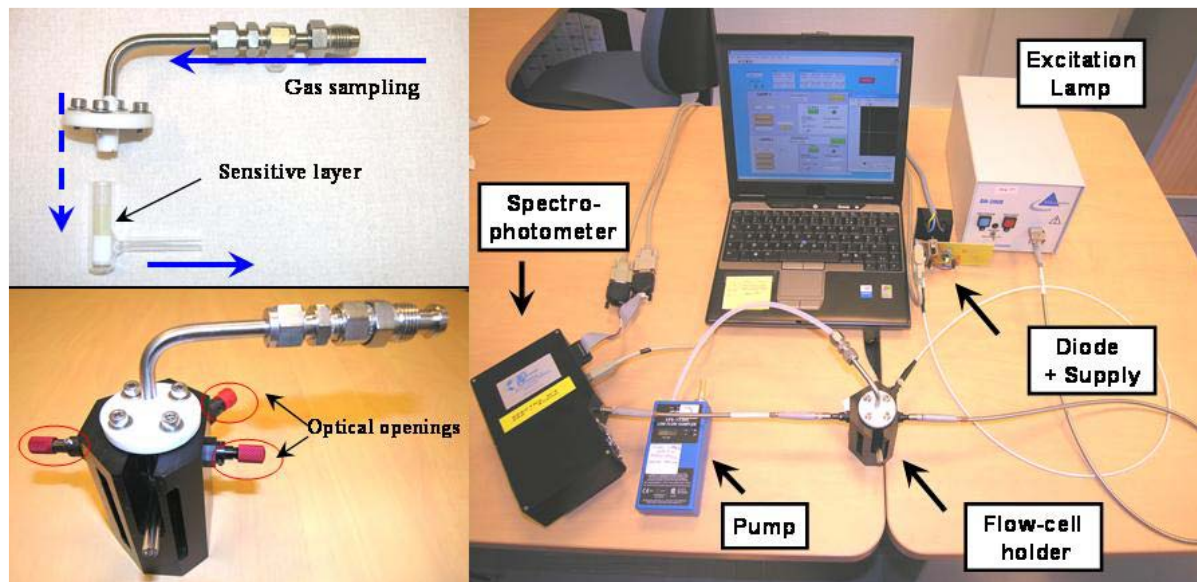


Figure 1. Fluoral-P reacts selectively with formaldehyde in the xerogel to form DiacetylDihydroLutidine : DDL. UV-Vis spectra of Fluoral-P (- -) and DDL (—) inside the xerogel. (A) Fluorescence spectrum of DDL, excited at 410 nm.

For the exposure of the doped thin films to formaldehyde or acetaldehyde, a home made system of gas mixture generation and dilution including a regulation of humidity, was built. It allows generating gas mixtures with formaldehyde concentrations covering the 400 ppt to 200 ppb domain and relative humidity from 0 to 95%. For the formaldehyde detection, a home-made prototype was also developed which comprises four units: the light sources



composed of either a UV-visible lamp or a light emitting diode (LED, 410 nm) with its power supply, a flow cell unit, a micro-pump, a miniaturized spectrometer from Ocean Optics as detection unit and a computer to drive the experiments.

Figure 2. Top left: The active layer of sol-gel, doped with Fluoral-P is inserted in a quartz flow-cell. Bottom left: Flow cell holder with three optical openings. Right: Whole detection system: Flow-cell holder connected to the lamp, the LED and spectrometer via optical fibres. The UV-visible lamp is used to measure absorption spectra of Fluoral-P and DDL over 190 and 450nm and the electroluminescent diode as the DDL excitation source. Signals are collected with a miniaturized spectrophotometer. The whole unit is controlled with a home-made software. The air to be analyse is sampled with a micro-pump.

The chemical sensor response was studied as functions of the formaldehyde concentration, under various conditions of flow rate, exposure duration, temperature (5-50 °C) and relative humidity (0-70 %). With optimized conditions of flow rate (220 mL.min⁻¹) and exposure duration (2 min), the fluorescence of DDL was collected as a function of time over a wide range of formaldehyde concentration. The calibration curves were then established by collecting the DDL fluorescence per time unit as a function of the formaldehyde concentration (Figure 2).

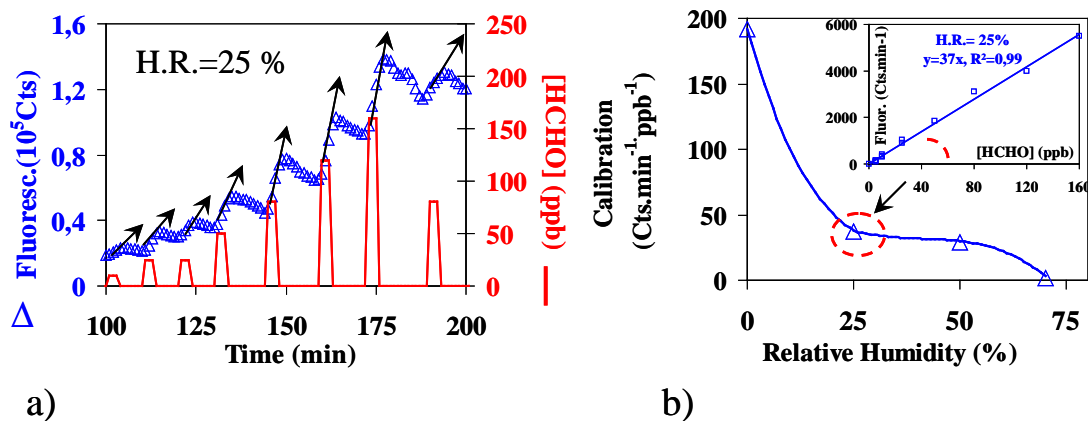


Figure 3. (a) Fluorescence collected during a dynamic exposure of the sensor (Δ). Pulses of 2 minutes, N_2 flow $220 \text{ mL}\cdot\text{min}^{-1}$, R.H. = 25 %, $2 < [\text{HCHO}] < 120 \text{ ppb}$ (right scale). (b) Calibration of the sensor as a function of the relative humidity. (Top right) Calibration curve at 25 % obtained from the results of figure a). (Δ) Fluorescence calibration curve for humidity normalized to formaldehyde concentration.

As water vapour was found to be the major interference in the formaldehyde detection, the calibration curves were also established at various relative humidity. From the slopes of these calibration curves, one can extract a final calibration curve which takes into account both the formaldehyde concentration and the relative humidity of the gas mixture to be analysed. With a pulsed-mode detection implying 2 to 3 minutes of exposure of the sensor to the pollutant, 40 measurements can be collected with a single sensitive layer (Figure 3).

To reduce or suppress the effect of humidity on the sensor, we have explored three main routes: i) the potentiality of various hydrophobic porous xerogel monoliths and thin films to be water-repellent, ii) the replacement of Fluoral-P by a more hydrophobic derivative, the 4-Amino-4-phenylbut-3-en-2-one, and iii) the addition of a drying unit.

Few methylated (Methyltrimethoxysilane) and fluorinated (3,3,3-Trifluoropropyltrimethoxysilane) alcoxide co-precursors were combined in various proportions with TMOS to give materials with different hydrophobicity properties. We have shown via contact angle measurements and thermo-gravimetric analyses that fluorinated xerogel monoliths and thin films display the most hydrophobic character since the water droplets does not diffuse into the matrix. However, their permeability to water vapour is totally different.

To scale the permeability of the porous material to water vapour, we proposed a new and original method based on the quantitative measurement of the lifetime of a probe molecule, Fluoral-P, trapped in the matrix and which is hydrolyzed in humidified atmosphere (Figure 4). With this method, we not only demonstrated that the fluorinated xerogels, repellent to liquid water, still display a permeability to water vapour, but also could quantify the efficiency of those materials to slow down the water vapour diffusion.

With the replacement of Fluoral-P by

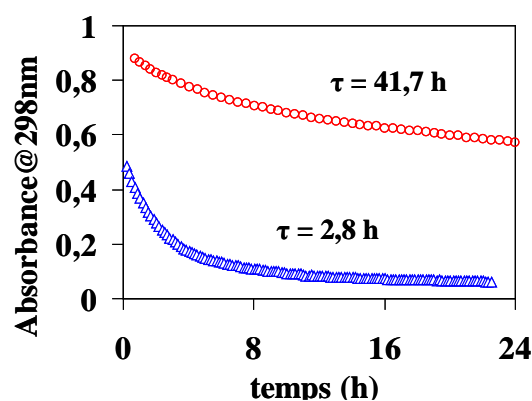


Figure 4. Fluoral-P hydrolysis by water vapour. Kinetics followed by UV-Vis spectroscopy is correlated to water vapour diffusion in the porous media. (Δ) Hydrolysis constant ($1/k = 2,8 \text{ h}$) for TMOS hydrophilic xerogel. (o) Hydrolysis constant ($1/k = 41,7 \text{ h}$) for a fluorated hydrophobic xerogel which is repellent to liquid water.

the phenylated derivative, the sensor was found to be less reactive. Finally, the addition of a drying CaCl_2 unit to trap water vapour allows the use of the sensor over the entire domain of humidity up to 100 %.

During this work, we were able to check the performance of the sensor by participating to two campaigns of measurements of formaldehyde. The first one, taking place in the south suburb of Paris, involved four laboratories and the measurement of outdoor pollutants. We found formaldehyde contents as low as 400 ppt to few ppb under high humidity (60 %) conditions. The second campaign, organized by the Institute of National Institute of Environment and Industrial Risks (INERIS: French National Institute for Industrial Environment and Risks) was dedicated to the inter-comparison of both commercial apparatus and methods under development in laboratories. The gas mixture to be analysed was composed of formaldehyde and six other aliphatic aldehydes. The results were presented by the organisers of the campaign (L. Chiappini & al., 7th International Conference on Air Quality – Science and Application, 129).

At the present time, the transfer of the sensor technology is undergoing with a collaboration with the CEA-LETI of Grenoble for the fabrication of an industrial prototype, INDIGO, whose performances are under investigation.

CONFERENCE REPORTS

IUPAC Sub-Committee on Photochemistry XXIV International Conference on Photochemistry, Toledo, Spain

Sub-committee on Photochemistry of IUPAC

The Sub-committee on Photochemistry of IUPAC, dependent on Division III of IUPAC (Organic and Biomolecular Division), met for a working lunch on July 21st, 2009, within the frame of the XXIV Conference on Photochemistry (ICP2009) which took place in Toledo (Spain) in the period July 19th-24th. The following colleagues were present: Cornelia Bohne (Canada), Silvia E. Braslavsky (Germany, Chairwoman), Fred Brouwer (The Netherlands), Axel Griesbeck (Germany, Titular member in Division III), Johan Hofkens (Belgium, new member), Hiroshi Miyasaka (Japan), Massimo Olivucci (Italy), Guillermo Orellana (Spain), Robert Pansu (France), Enrique San Román (Argentina), Masaki Terazima (Japan), David Worrall (United Kingdom).

The meeting started with a discussion about the need for the existence at large of the Sub-Committee, in view of the fact that any chemist (or any non-chemist as well) can propose a new project within the present IUPAC structure. The general view was that the Sub-Committee was a very good structure in order to discuss personally once a year (on the occasion of the International Conference on Photochemistry the odd years and of the IUPAC Sponsored Symposium on Photochemistry the even years), as well as through e-mail, the progress of the initiated projects and the need for new projects, whereas the presence of the “Photosciences” within the IUPAC structure is maintained through the Sub-Committee. **The Sub-Committee understands itself as a control and source of new ideas for all projects concerned with the interaction of light and matter.** It should also connect with the three Societies on Photochemistry, the Inter-American (Inter-American Society on Photochemistry, IAPS), the European (European Photochemical Association, EPA), and the Asian (Asian Society on Photochemistry, ASP). This was a fruitful discussion during which several ideas for new projects came to the surface (see below). The undersigning, Silvia Braslavsky, was convinced by the Sub-Committee to keep the chair based on her experience with the writing of various documents and her knowledge of the photosciences community. I accepted and thank very much my colleagues for the confidence deposited in my work and “pushing” abilities.

Information was provided on the progress of various projects as follows:

1. **“Glossary of Terms on Photocatalysis and Radiocatalysis”** (Silvia Braslavsky).

The almost finalized draft has been sent for a last round of comments to the working party and to the members of the Sub-Committee on Photochemistry. **Comments on the draft should be sent to Silvia Braslavsky before the end of August 2009.** Some comments have already been received and we hope to submit officially the document to IUPAC by September 2009.

2. **“Reference Methods, Standards and Applications of Photoluminescence”**

(Enrique San Román and Fred Brouwer). Three documents (from the 6 planned documents within the frame of the project) are at different levels of completion:

- The 1st document in the series, “**Fluorescence Standards: Classification, Terminology and Recommendations on their selection, use and production** (Technical Note)” whose status is defined as provisional in the sense that it passed all the filters within the Task Group and is ready to be submitted to IUPAC for internal and external review.
- The 2nd document, “**Characterization of photoluminescence measuring systems** (Technical Note)” which is a draft version intended for internal use, as a last review - revision step is still pending.
- The 3rd document is also a draft version: “**Reference Methods, Standards and applications of photoluminescence**” It contains a notice to be sent accompanying the first document and should also be posted at the IUPAC web page. Opinions about this notice will be welcome.

Anyone wishing to see and comment on the documents should request them to Enrique San Román <esr@qi.fcen.uba.ar> or **Fred Brouwer** a.m.brouwer@uva.nl

3. A project has been submitted to IUPAC by **Axel Griesbeck** aco01@uni-koeln.de <griesbeck@uni-koeln.de> on “Photochemical Synthetic Methods”. The project is in the process of evaluation within IUPAC.

4. A new project has been proposed to the Sub-Committee by **Guillermo Orellana** (orellana@quim.ucm.es) on “**Long-lived Emission Standards**”. Guillermo will submit the project to IUPAC by October 2009. Robert Pansu and Stephan Landgraff are members of the Sub-Committee working in the field. Guillermo will suggest a series of names as members of the working party.

5. A suggestion was made to ask **Tito Scaiano** (Ottawa) to provide the series of transient spectra of triplet states and radical species he has measured and collected over many years for inclusion in a sort of extended collection of transient species. **Trevor Smith** had agreed in 2008 to initiate this project, that should be written and submitted to IUPAC. Johan Hofkens <johan.hofkens@chem.kuleuven.be> and Hiroshi Miyasaka <miyasaka@chem.es.osaka-u.ac.jp> are ready to participate in this project and provide spectra of excited singlet state species.

6. There is a need for actinometer standards in the UV. Jim Bolton has measured the quantum yield of the ferrioxalate actinometer following a strict protocol and has arrived to the conclusion that the value 1.25 for the quantum yield upon excitation at 254 nm is definitively wrong. It should be about 1.40 at 254 nm. The protocols are available from Jim Bolton <jbolton@boltonuv.com>. This is a question to be taken by the photochemistry community at large. **David Worrall** has agreed to initiate some consultations. In the mean time Marta Liras at Tito Scaiano’s research group in Ottawa is applying some actinometers for wavelengths in the UV region (190 nm). It would be advisable to propose a project to IUPAC on this subject, since these wavelengths are and will be more and more used in important applications such as water remediation.

Axel Griesbeck informed that the **Glossary of Terms used in Photochemistry** (<http://media.iupac.org/publications/pac/2007/pdf/7903x0293.pdf>) will be included in the CRC-Handbook of Photochemistry and Photobiology, edition 3, which is very advanced in its preparation.

The Sub-Committee suggested enhancing the information about the work of the Sub-Committee by distributing a leaflet about its activities and the possibilities of members of the photochemical communitie(s) to participate in these activities, during the photochemistry meetings around the world. Silvia Braslavsky and Enrique San Román will write such a leaflet.

The Sub-Committee will meet again during the IUPAC-sponsored Symposium on Photochemistry to be held in Ferrara, Italy, at the end of July 2010. If you have any questions and/or would like to participate in any of the projects outlined or have ideas for new projects, please contact us !!

Membership of IUPAC (Div. III) Sub-Committee on Photochemistry (2009-2011)

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Chairwoman

Sub-Committee on Photochemistry

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INVITATIONS

XXIII IUPAC symposium on Photochemistry July 11th to 16th, 2010, Ferrara, Italy

Dear Colleagues,

On behalf of the scientific and organizing committees, I cordially invite you to attend the XXIII IUPAC Symposium on Photochemistry. The Symposium will be held in Ferrara, Italy, from the 11th to the 16th of July, 2010. This will be the latest in a long series of successful symposia, carrying on a tradition of premier biennial gatherings of scientists with interests in photochemistry and related subjects.

The symposium will provide a framework for presentation and discussion of ideas and information on the interaction of light and matter drawn from the following areas:

- Organic and inorganic photochemistry,
- Solar energy conversion
- Materials science and engineering
- Supramolecular chemistry
- Nanotechnology
- Photobiology and biophysics
- Photonics and imaging
- Spectroscopy and instrumentation
- Photochromism
- Industrial applications of photochemistry and photophysics

The scientific program includes plenary lectures, invited lectures, oral presentations, and poster sessions. The program will be designed to cover a broad spectrum of topics and to represent the activity of a wide variety of countries. The following distinguished scientists have agreed to present plenary lectures at the Symposium:

- Luisa De Cola (Wilhelms-Universität Münster)
- Rienk van Grondelle (Vrije Universiteit Amsterdam)
- Devens Gust (Arizona State University)

- Yoshihisa Inoue (Osaka University)
- Stefan Matile (University of Geneva)

- Thomas J. Meyer (University of North Carolina)
- Massimo Olivucci (University of Siena)

Details and information concerning registration, fees, abstract submission, accommodation and deadlines will be posted at a later date on the Symposium website:

<http://web.unife.it/convegna/iupac-photochem-2010/>

I look forward to seeing you at this stimulating meeting.

Franco Scandola, Chair

INVITATIONS

Ciamician-Paterno Heritage Photosciences. A Look into the Future

Dear Colleagues,

Photochemistry is a hundred years old!

Indeed, by 1910 a large fraction of the presently known key photoprocesses had been discovered and thoroughly described. This was mainly due to the work by two great scientists, Giacomo Ciamician and Emanuele Paterno, who proclaimed photochemistry the science of the future.

In a time where everybody is hurrying from a meeting to the next one and very little discussion takes place, take one day free and participate into a unique event where it will be attempted to find again the enthusiasm of that time and predict which will be the new exciting pathways for photosciences in the future.

Please find attached a leaflet with the invitation to the meeting. Information will be updated on the symposium website:

<http://www.unipv.it/photochem/heritage.htm>

as soon as available. We look forward to see you all in Ferrara next year!

Kind regards

Angelo Albini
for the Organizing Committee

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INVITATIONS

Semiconductor Photochemistry SP3 April 12th to 16th 2010, University of Strathclyde, Glasgow, UK

SP3 Conference April 12th-16th 2010

The aim of the conference is to cover recent developments in the area of semiconductor photochemistry. The topics will encompass:

- Solar to Electricity conversion (DSSCs) and Tandem Cells
- Solar to Chemical Energy conversion (such as water splitting and CO₂ reduction)
- Photosterilisation
- Organic Photosynthesis
- Air and Water Remediation
- Self Cleaning Surfaces

Invited speakers include: D.W. Bahnemann; D. Ollis, M. Hoffmann K Hashimoto, K Domen, J.M. Herrmann, W Choi, B Ohtani, S Abdel-Mottaleb, T. Nann, M.Litter, J. Durrant, B. O'Regan, S. Hayase, W. Yuxiang, J. Zhao, G Meyer, J Kiwi

The conference will comprise 3 days dedicated to the above, a day out visiting a Scottish Castle followed by a 1 day international postgraduate symposium (on 16th) Thanks to those who have already shown an interest in attending and presenting at the above conference.

If you have still to confirm your attendance please complete the online registration form

<https://www.sp3conference.com/registration>

Please note: As this is a Network sponsored event ALL members will receive upto £150 towards their travel and subsistence costs provided they **register before 31st December**.

INVITATIONS

RSC Photochemistry Group Young and Early Career Researchers' Meeting January 13th 2010, Durham University, UK

The Royal Society of Chemistry Photochemistry Group will be holding its biannual Young and Early Career Researchers' Meeting on Wednesday, January 13th 2010, 11 am - 5 pm in the Department of Chemistry, Durham University .

Registration fees:

Students £20

RSC Members £35

Non-members £50

Registration covers lunch, refreshment breaks and book of abstracts.

Registration form is available at:

<http://www.dur.ac.uk/j.a.g.williams/RSCphotochem.htm>

Abstracts should be prepared using the template provided at the above website, and submitted electronically to:

j.a.g.williams@durham.ac.uk

Deadline for abstract submission: Friday, December 18th 2009

INVITATIONS

International Conference on Pure and Applied Chemistry (ICPAC 2010) July 26-30, 2010, in Mauritius.



Call for Paper (deadline 15th March 2010) and Workshop/Symposium (deadline 31st December 2009)

International Conference on Pure and Applied Chemistry (ICPAC 2010) will be held on July 26-30, 2010, in Mauritius.

The Organising Committee has adopted the theme “Chemistry for Sustainable Development”.

The Organising Committee would like to invite all academics and researchers to attend this International meeting.

The program will feature a wide variety of plenary and contributed lectures, as well as poster sessions.

Participants can submit abstracts either in English or French. This conference will provide a platform for participants to disseminate latest findings of their research.

It will also be an opportunity for participants to visit the island of Mauritius, famous for its Sun, Sea and Sand.

Highlight of ICPAC 2010

- Renowned Plenary Speakers including Prof Aaron Ciechanover the 2004 Nobel laureate in Chemistry
- Workshops/Symposia will be conducted by experts
- All aspects of Chemistry will be considered
- Full papers will be published by Springer after peer reviewing
- Programme include Welcome reception, Banquet, One day tour and Entertainment evening
- Local and Post Conference tours are available

We look forward to welcoming you at this conference.

Organising Committee

Henri Li Kam Wah, President

Ponnadurai Ramasami, Chairman

Minu Gupta Bhowon and Sabina Jhaumeer-Laulloo, Secretaries

Email: icpac2010@uom.ac.mu

Website: <http://www.uom.ac.mu/icpac/>

INVITATIONS

Central European Conference on Photochemistry CECF 2010



organized by **EPA** Austria

Sunday, February 7 to Thursday, February 11, 2010, Bad Hofgastein



Venue:
Bad Hofgastein, Congress Center

For more information please see:

www.ptc.tugraz.at/gastein

Local coordinator: Dr. S. Landgraf, Graz University of Technology

INVITATIONS

6th European meeting on Solar Chemistry and Photocatalysis: Environmental Applications (SPEA6)

We are pleased to invite you to attend the **6th European meeting on Solar Chemistry and Photocatalysis: Environmental Applications (SPEA6)**, to be held at **Masarykova kolej** in Prague, Czech Republic from June 13th to 16th, 2010.

ORGANIZERS

SPEA 6 is organized jointly by

- **Institute of Chemical Technology, Prague (ICT Prague)**
- **Jaroslav Heyrovský Institute of Physical Chemistry, Academy of Science (JH IPC)**

MAIN TOPICS

The conference will deal with the following topics:

- 1. Water treatment and disinfection**
- 2. Air treatment**
- 3. Environmental photochemistry**
- 4. Photoprocesses utilizing solar light**
- 5. Development of new materials for photochemistry and photocatalysis (visible light active photocatalysts, composite materials)**
- 6. Models for photochemistry and photocatalysis (mechanistic studies, engineering modelling)**
- 7. Commercial applications, standardization**

For more information see <http://www.spea6.com/>

INVITATIONS

16th International Symposium on Bioluminescence and Chemiluminescence ISBC 2010 April 19-23, 2010, Lyon, France

<http://isbc2010.univ-lyon1.fr>

Dear Colleague,

It is a great pleasure to invite you to attend the 16th International Symposium on Bioluminescence and Chemiluminescence, Lyon, 2010 (<http://isbc2010.univ-lyon1.fr>).

The ISBC series started in 1978 in Brussels, Belgium, and is held now every two years in different countries over the world: San Diego, CA, USA (1980), Birmingham, UK (1984), Freiburg, Germany (1986), Florence, Italy (1988), Cambridge, UK (1990), Banff, Canada (1993), Cambridge, UK (1994), Woods Hole, MA, USA (1996), Bologna, Italy, (1998), Monterey, CA, USA (2000), Cambridge, UK (2002), Yokohama, Japan (2004), San Diego, CA, USA (2006), Shanghai, China (2008).

Experts from all over the world will gather for the **16th ISBC in Lyon** to discuss the state of the art in all

aspects of bioluminescence, chemiluminescence and their applications.

The scope of the symposium will include among others:

- Biosensors and bioassays
- In vitro and in vivo reporter gene technology
- Biochemistry of bioluminescence
- Chemistry of chemiluminescence
- Electrochemiluminescence and electrogenerated luminescence
- Analytical applications
- Biology and physiology of luminous organisms
- Instrumentation
- Imaging
- Microarrays, biochips and miniaturized systems
- Immunoassays
- Application in medicine, molecular biology, forensic sciences, clinical chemistry, food analysis, cosmetics...
- Bioluminescence and chemiluminescence resonance energy transfers
- Nucleic acid hybridization assays
- Fluorescence of biomolecules

We look forward to welcoming you to Lyon.

Loïc J. Blum
ISBC 2010 Chair

Contact us by email : isbc2010@univ-lyon1.fr

INVITATIONS

Solar '10: Nano/Molecular Photochemistry and Nanomaterials for Green Energy Development **15-17 February 2010, Cairo, Egypt**

Going NanoGreen in a big way in Cairo

Don't miss this exciting interdisciplinary conference. Listen to a panel of distinguished speakers covering the following important topics:

- Nanostructured Solar Cells
- Nanomaterials for Solar Applications
- Fundamental and Applied Photochemistry and Photophysics
- Advanced Photocatalysis
- Photonics Materials
- Modeling Methods in nano Science
- Thin Film Photovoltaics
- Solar Energy Commercialization
- Techniques and Systems



More details are available at

<http://www.photoenergy.org/solar10.pdf> and
<http://www.photoenergy.org/abstract-template.doc>

See you in Cairo!

Timeline and registration Fees

November 10, 2009	Abstract Submission http://www.photoenergy.org/abstract-template.doc
November 16, 2009	Notifications of acceptance
November 27, 2009	Early Bird Registration [555€participant, 355€Student]
December 11, 2009	Normal Registration [605€participant, 405€Student]
February 14, 2010	Arrival; On Site Registration [655€participant, 455€Student]
February 15-17, 2010	Conference
February 18, 2010	Departure and start of Luxor tour [450€person including transportation, accommodation in a double room and tours]
February 20, 2010	Tour Ends In Cairo at Noon

Registration fee covers Reception, 3 Lunches, Banquet ticket, Conference Excursion, Coffee breaks, Book of Abstracts and admission to all scientific sessions.

Contacts

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MEMBERSHIP APPLICATION FORM



EUROPEAN PHOTOCHEMISTRY ASSOCIATION 2010 MEMBERSHIP RENEWAL/APPLICATION FORM

Please complete the form and send it to the Treasurer by mail or fax
(do not use e-mail for security reasons!):

Dr. Silvio Canonica Eawag, W+T Dept.
Ueberlandstrasse 133, P.O. Box 611, CH-8600 Dübendorf, Switzerland
(Fax +41 44 823 5210)

I wish to renew/apply for membership of the European Photochemistry Association (EPA)

Family name: _____ First name: _____ Middle initial(s): _____

Date of birth (dd/mm/yyyy): _____

If you are applying for a new membership or if your contact details have changed, please fill in the following section:

Address: (Please use your institutional address)

Tel: _____

Fax: _____

Email: _____

Membership fees for 2010 in EUR

(please check one box)

The membership fee includes electronic subscription to the EPA official journal *Photochemical & Photobiological Sciences*, the EPA Newsletter and reduced conference fees.

regular	<input type="checkbox"/> 30 EUR
student*	<input type="checkbox"/> 15 EUR * please supply attestation

For countries with economic difficulties, a reduced fee of 15 EUR can exceptionally be applied on request (only upon written approval by the Treasurer).

Alternative methods of Payment

(please fill in either 1. or 2.)

<p>1. Credit card. Please fill in the details below (all details compulsory).</p> <p>I, the undersigned, authorise the European Photochemistry Association to debit my credit card:</p> <p><input type="checkbox"/> MasterCard <input type="checkbox"/> Visa</p> <p>Card number _____ Expiry date: _____ For the sum of _____ EUR</p> <p>Amount of EUR in words: _____</p> <p>Name of card holder: _____ Signature of card holder: _____</p> <p>Security code: ___ (this code corresponds to the last three digits to the right on the back of your credit card)</p>			
<p>2. Bank order to UBS AG, Roemerhofplatz 5, P.O. Box 38, CH-8030 Zürich, BIC (Swift): UBSWCHZH80A</p> <p>Account holder: European Photochemistry Association, c/o Dr. Silvio Canonica, 8600 Dübendorf</p> <p>IBAN: CH27 0025 1251 8404 5260 C</p> <p>I herewith certify that I effected a bank transfer on _____ (fill in date) for the sum of _____ EUR</p> <p>to cover the EPA membership fee for the year(s) 2010 - _____ . Signature of the member: _____</p> <p>Please ensure that you are clearly identified on the bank order.</p>			