

## Symposium-in-Print: VIII ELAFOT, La Plata, Argentina, 2004

### Introduction

## Encuentros Latinoamericanos de Fotoquímica y Fotobiología (ELAFOT): The Latin-American Photochemical and Photobiological Community<sup>¶</sup>

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Received 7 June 2005; accepted 9 June 2005

### ABSTRACT

The photochemical and photobiological researchers in Latin American meet biannually at a regional meeting known as Encuentros Latinoamericanos de Fotoquímica y Fotobiología (ELAFOT). The goals of this series of meetings are to discuss leading scientific work, to become acquainted with the latest research findings in the discipline, to exchange ideas, to initiate collaborations between groups and to strengthen the scientific interactions between young researchers and senior experts from the region and from developed countries. During 8–12 November 2004, the eighth such meeting took place in La Plata, Argentina. In this introduction we present a brief history of the ELAFOT meetings and a summary of the most recent gathering and the papers presented in this Symposium-in-Print.

### HISTORICAL PERSPECTIVE

The complete list of Encuentros Latinoamericanos de Fotoquímica y Fotobiología (ELAFOT) meetings is given in Table 1. The ELAFOT series started in August 1982, with the Primer Encuentro Latinoamericano de Fotoquímica (First Latin American Meeting on Photochemistry) organized by Eduardo Lissi and his group at the Universidad de Santiago de Chile. The plenary lectures included the following: Atmospheric Photochemistry by Jack Calvert (National Research Center for Atmospheric Research, Colorado, United States), Biogenerated Excited State Reactions by Giuseppe Cilento (Universidade de São Paulo, Brazil), Photogeneration of H<sub>2</sub> in Sacrificial and Nonsacrificial Systems by Juan Kiwi (ETH Laussane, Switzerland), Use of Laser Flash Techniques in the

Study of Organic Reaction Intermediates by Tito Scaiano (National Research Council, Canada), Photochemical and Structural Studies of Organized Assemblies: Interaction in Micelles, Microemulsions, Vesicles and Monolayers by David Whitten (University of North Carolina, United States), Reversible Photochemistry and its Biological Applications by Gregorio Weber (University of Illinois, United States), and Phytochrome: Photophysical and Photochemical Events of the Plant Pigment by Silvia E. Braslavsky (Max-Planck-Institut für Strahlenchemie, Germany). Nineteen Latin American research groups presented their research projects and results and they are listed (Research Group Presentations) in the book edited by the Universidad de Santiago de Chile. This meeting and all following ELAFOT meetings were supported by the Inter-American Photochemical Society. A week before this meeting a school on photochemistry (Primera Escuela Latinoamericana de Fotoquímica) took place.

This first ELAFOT meeting was relatively small, with about 50 participants from Argentina, Brazil, Chile and Venezuela. As usual, the economic situation in Latin America was difficult, and in Argentina it was particularly miserable. The only participant from Argentina was Carlos Previtali. It was the first meeting in which the Lissi group, forced to leave Argentina in 1966 and later dispersed across various countries (Argentina, Brazil, Canada, Chile, Germany and Venezuela), had reunited (in part) at a scientific conference.

The second ELAFOT was held in São Carlos, Brazil, in February 1988 and was organized by Miguel Neumann, Frank Quina, Adelaide Faljoli, David Nicodem and Fergus Gessner from Brazil, and Carlos Previtali and Eduardo Lissi. There were again about 50 participants (according to the photograph). Lectures were given by Andre Braun (Switzerland), Frans de Schryver (Belgium), Carlos Previtali (Argentina), Tito Scaiano (Canada), Silvia E. Braslavsky (Germany), Franco Scandola (Italy) and Dick Weiss (United States, but also Latin-American by choice). The 58 posters produced lively discussion in the poster sessions.

The third meeting was organized by a group led by Enrique San Román in Mar del Plata, Argentina, and was attended by 102 participants: 61 from Argentina, 18 from Brazil, 13 from Chile and 10 from Europe and North America. Substantial financial support for this meeting was obtained from several international organizations, including AIP (Association Internationale de Photo-

<sup>¶</sup>Posted on the website on 6 July 2005

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Abbreviations: ELAFOT, Encuentros Latinoamericanos de Fotoquímica y Fotobiología; I-APS, Inter-American Photochemical Society; VUV, vacuum-ultraviolet.

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**Table 1.** The years and locations of ELAFOT meetings. Further information about the meetings can be obtained from the newsletters of the European Photochemical Association as indicated

ELAFOT	Year	Location	EPA Newsletter
I	1982	Santiago, Chile	
II	1988	San Carlos, Brazil	32, March 1988
III	1991	Mar del Plata, Argentina	44, March 1992
IV	1994	Valparaiso, Chile	51, July 1994
V	1997	Los Cocos, Argentina	61, Nov. 1997
VI	1999	Teresópolis, Brazil	68, March 2000
VII	2002	Viña del Mar, Chile	Electronic Feb. 2003
VIII	2004	La Plata, Argentina	

biologie), TWAS (Third World Academy of Sciences) and research funding organizations in Argentina.

The fourth ELAFOT, organized by Elsa Abuin, Eduardo Lissi, Patricio Sotomayor, and Eduardo Silva, was held in Valparaiso, Chile, in 1994, and was also called the First Ibero-American ELAFOT Meeting. However, due to financial constraints, only two Spanish photochemists, J. L. Bourdelande (Barcelona) and one of his students, could join the meeting. There were 82 posters and a total of 90 Latin American researchers and students plus a large number (14 European and North American senior researchers) of photochemists and photobiologists from industrialized countries.

The fifth ELAFOT was held in Los Cocos, Argentina, and was organized by Sonia Bertolotti and Carlos Previtali. It drew over 100 participants, with three senior Spanish colleagues (Ulises Acuña, Paco Amat and Diego Armesto) and for the first time a Mexican photochemist living in the United States, Miguel García Garibay. A workshop on Photocatalysis and Environmental Applications with almost 40 participants followed the main conference. Photobiology was almost absent and participation was limited to scientists from three Latin American nations.

The sixth ELAFOT was organized by a committee led by Ira Brinn and held in Teresópolis, near Rio de Janeiro. The seventh ELAFOT was organized by Antonio Zanocco and his committee and held in Viña del Mar, Chile. Since the first ELAFOT, the numbers of posters and participants (82 and about 120, respectively) have steadily increased, the level of research is high, the diversity of subjects is broad and the banquet is always a wonderful event. The Photobiology label is still there, but few groups do photobiological work in Latin America, although many groups work on chemical problems of biological interest. Apart from the occasional participation of a few colleagues from Venezuela and Miguel García Garibay from Mexico and Los Angeles, it has been impossible for colleagues from other Latin American countries to take part in the ELAFOT meetings, either because the distances are too large, the travel costs too high, or just because there is a dearth of photoscientists in many Latin American countries.

#### Further efforts to create ties to the Latin American community

In February 1999, Elena Vigil from La Habana, Cuba, organized *Φotociencias 99*, which was something like, "get to know your photo-colleague in Cuba and think what can be done with the generous sunshine we have." It was a wonderful meeting in which Cuban laser physicists and plant physiologists, plus organic chemists, medical doctors and semiconductor specialists met for

a week together with the invited speakers from Europe and the United States. Second in the series was *Φotociencias 2002* organized again by a group led by Elena Vigil. The conference was complemented by a set of courses, all sponsored by the Inter-American Photochemical Society (I-APS), the International Union of Photobiology, the European Society of Photobiology, the International Commission on Optics and the Centro Latinoamericano de Fisica. The external financial support allowed the participation of young colleagues from Mexico, Colombia, Peru, Spain and Chile. Several Mexican photoscientists were present at the meetings. The third *Φotociencias* meeting was held in Havana in March 2005.

We have come a long way since the realization that the photochemists and photobiologists in Latin America needed to meet and get to know one another, create collaborative efforts and share equipment and expertise. It was also realized that due to decades of deep economic trouble, students in the far south of the South American continent need to be given opportunities to meet scientists from the industrial countries working on frontier research areas. The scientists from the industrial countries have always fully financed their way to the ELAFOT and *Φotociencias* meetings. The financial support obtained from various organizations for the ELAFOT and *Φotociencias* meetings has always been used to support young fellows and students from Latin America to attend the meetings.

The two meetings organized by I-APS in Latin America have also contributed to strengthening contacts between the research groups in Latin and North America. The first was organized by Frank Quina and Dick Weiss and held in Iguazú Falls, Brazil, in May 1996. The second Southern I-APS meeting was organized by Pedro Aramendía and Miguel García Garibay (with strong input from the colleagues from Córdoba, especially Gustavo and Gerardo Argüello) in Ascochinga, Argentina, in May 2001. The 17th I-APS meeting will be held in Salvador, Brazil in June 2006 and is being coordinated by Frank H. Quina and Cornelia Bohne. The conference will be preceded by an NSF-CNPq (United States-Brazil) workshop entitled "The interplay of theory and experiment in photochemistry" coordinated by Jack Saltiel.

#### The Eighth ELAFOT and the Symposium-in-Print

The eighth ELAFOT was held in La Plata, Argentina, in the beginning of November 2004. The scientific committee comprised Norman A. García, Marcelo H. Gehlen, Eduardo G. Lissi, Frank H. Quina, Enrique San Román and Antonio L. Zanocco. The local organizing committee involved Mónica Gonzalez, Daniel Mártire, Paula Caregnato, Franco Cabrerizo, Janina Rosso, Laura Villata, Andrés Thomas, Carolina Lorente, Fernando S. García Einschlag, Gabriel Bilmes, Paula Juliarena, Gustavo Ruiz, Norma Caballero, Luciano Carlos and Marcos Papais. There was a total of 28 oral presentations and 160 posters. We had the fortune of being able to present a set of papers resulting from this meeting. One paper associated with the ELAFOT meeting was published earlier this year in *Photochemistry and Photobiology*. In that work, Norman Allen and coworkers reported a series of studies on the photocatalytic behavior of a variety of nano- and microparticle-grade anatase and rutile titanium dioxide pigments (1). Goals of that work include the development of self-cleaning microbial surfaces and the development of coatings to destroy atmospheric pollutants such as nitrogen oxides.

Antonio Claudio Tedesco and coworkers reported on the photophysical properties of two porphyrin molecules that contain

crown ether substituents (2). The porphyrins examined exhibit high quantum efficiencies for intersystem crossing and energy transfer to generate singlet oxygen. The authors suggest that the amphiphilic nature of these porphyrins could improve their localization within tumor cells and that the crown-ether substituted porphyrins could be reasonably used as photosensitizers for photodynamic therapy applications.

The vacuum-ultraviolet (VUV)-initiated oxidation of functionalization of polystyrene surfaces in the presence of water and molecular oxygen was examined by André M. Braun and coworkers (3). Irradiation caused an increase in the surface concentration of hydroxyl and carbonyl moieties, ultimately reaching a limiting value. VUV irradiation offers an alternative to conventional approaches for the photochemical oxidation and surface modification of polystyrene.

José L. Solís and coworkers examined the photoreactivity of zinc oxide films that were fabricated from a 0.1 M zinc acetate solution in a mixture of ethanol and water using spray pyrolysis (4). The roughness of zinc oxide films depends on the pH of the precursor solution. The photoelectrocatalytic degradation of methyl orange in aqueous solution using zinc oxide thin films was then studied and the efficiency of methyl orange degradation was shown to be related to the roughness of the film.

V. Mariana Freytes and coworkers examined the IR multiphoton dissociation of gaseous  $\text{CDCl}_3$  in presence of  $\text{O}_2$  and  $\text{NO}_2$  (5). In both cases,  $\text{CCl}_2$  radicals generated by the absorption of multiple infrared photons reacted to form  $\text{CCl}_2\text{O}$  as the main carbonated product.

Andrés H. Thomas, Alberto L. Capparelli and coworkers examined the ability of 6-methylpterin (MPT) to photogenerate and quench in aqueous solution (6). Quantum yields for generation of singlet oxygen were  $0.10 \pm 0.02$  and  $0.14 \pm 0.02$  in acidic and alkaline media, respectively. The rate constant for the chemical reaction between singlet oxygen and MPT was determined to be  $4.9 \times 10^6 \text{ M}^{-1} \cdot \text{s}^{-1}$  in alkaline medium. Hydrogen peroxide is generated through the photooxidation of MPT, which is an important finding because hydrogen peroxide is involved in pathogenesis of vitiligo and the accumulation of different pterin derivatives in the epidermis of affected patients.

The room temperature UV photolysis of ozone in the presence of chlorine was studied by Jorge Codnia and coworkers (7). The reactants and the final and intermediate reaction products were quantified by real-time mass spectrometry. The results from their work allowed the determination of the wall-loss rates of the  $\text{O}(^1D)$ ,  $\text{Cl}$  and  $\text{ClO}$  radicals.

E. Walter Helbling and coworkers review work on the effects of solar UV radiation on the marine phytoplankton in Patagonia, an area that is located in close proximity to the Antarctic ozone "hole" and thus receives enhanced UV-B radiation in addition to

the normal levels of UV-A and photosynthetically available radiation (8).

Georgina Sánchez and collaborators describe the genotoxic potential of three quinolones—ofloxacin, nalidixic acid and ciprofloxacin—upon UV exposure through analysis of comet assays on Jurkat cells (9). Exposure of the cells to the quinolones without addition of UV light results in genotoxicity. Their work also demonstrates that photodecomposition of the quinolones results in DNA damage. Ofloxacin and nalidixic acid show similar behavior with and without UV light. Ciprofloxacin shows enhanced DNA damage with addition of the UV light.

This collection of papers demonstrated the richness and diversity of topics presented at the ELAFOT meeting. Fruitful contacts and deep friendships have been made between the research groups in Latin America and the rest of the world. Many new research projects have been developed in recent years as results of these meetings, and there is a rich exchange of students who travel to other labs (in their own or other countries) to perform experiments that are not possible at their home institutions. We hope that this collection of articles advances such collaborative scientific exchanges.

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