

Editorial

Introduction by the EU Project co-ordinators

1. TMR Programme

PSA participation in the European Commission (EC) Large-Scale Facility (LSF) activities began in 1990 with its inclusion in the ‘Large Installations Programme’ (LIP) of the ‘III Framework Programme for Science, Research and Development’. There has been an almost uninterrupted active participation along this path, most recently in the EC-DGXII’s ‘Training and Mobility of Researchers’ (TMR) programme, which ran between 1996 and 1998 (Contract: ERBFMGECT950023).

The TMR-LSF activity aims at increasing the efficiency of scientific activity within the European Community by creating conditions favourable for exchange of scientific information and know-how. It also contributes to optimal use of large European facilities. Professors, senior scientists, post doctoral and PhD students from many countries of the EU have met regularly for scientific discussions, exchanging their research experience in like subjects, thereby, not only stimulating progress in the science, but also enhancing personal co-operation between the various research groups. Moreover, the close contact established has initiated co-operation in other R&D projects.

Under this program, access to the PSA has been provided free of charge to 50 different user groups or individuals throughout the Member States of the European Commission and Associated States (i.e., Norway, Liechtenstein, Iceland and Israel). This has been organised in yearly rounds, granting access to 28 groups per year after a selection process carried out by an independent panel of experts.

For all the groups awarded grants, the EC covered the user’s travel and subsistence expenses, as well as facility operating costs. Users were given access to

infrastructure and logistic, technical and scientific support at the PSA in order to take maximum advantage of the unique solar facilities available. Apart from daily access, some general yearly events were also held. *Annual Users Meetings* were organised at the beginning of each year to allow the selected users and on-site project leader to meet each other, to study the research proposals and to arrange the year’s facility schedules. To ‘close the circle’, the PSA invited all the users to a *Workshop* at the end of the year’s access period so that they could exchange results and experience. The proceedings of these *Workshops* [1,2] summarise all the research carried out within the 3-year program in a single significant publication. As an accompanying measure, a ‘Summer School’ receiving economic support under the TMR umbrella was also organised. This international Summer School consisted of two one-week courses, which attempted to bring together both the most relevant experts in Europe and the most motivated young researchers in fields where solar thermal energy has shown its feasibility as an energy source. The first course, entitled ‘Solar Thermal Electricity Generation’, was held in July, 1998, and the second, in September, with the title ‘Industrial Applications of Solar Chemistry’. All the lectures have been compiled and two books will be published by CIEMAT in 1999 [3,4].

2. Detoxification of Wastewater within TMR-PSA Programme

A wide range of research topics were studied within the PSA TMR activities: Detoxification of waste water, synthesis of fine chemicals, testing of advanced control algorithms, materials testing at high temperatures, bio-

climatic architecture (LECE laboratory), dish/Stirling systems and process heat. This issue of *Catalysis Today* contains the results obtained in the field of *Detoxification of Wastewater*, which is only a partial outcome of the project supported by the European Commission TMR programme at Plataforma Solar de Almería. This collaborative research has led (so far) to 10 joint publications (not including this issue of *Catalysis Today*) in refereed journals and 29 conference proceedings. Research involved nine institutions which were given a total of 16 man-months of access. The major achievements during 1996–1998 were:

- A new type of photoreactor, made of a cylindrical photoanode placed around an inner compartment, has been adapted to solar compound parabolic concentrator (CPCs) and parabolic trough (PTC, Helioman) collectors. Abatement of model pollutants has demonstrated up to three-fold higher organic oxidation rates per gram of TiO_2 compared to TiO_2 slurries (tested under the same experimental conditions). Clearly, charge separation is much better when an external electrochemical bias is applied to Ti/TiO_2 photoanodes under irradiation.
- Comparison of new TiO_2 catalysts and the synergistic effect of GAC (activated carbon) combined with TiO_2 .
- Solar photocatalytic oxidation of cyanide in aqueous suspensions containing polycrystalline TiO_2 was successful.
- Photocatalytic degradation of pesticides (imidacloprid and pirimicarb) under solar radiation.
- Photocatalytic activity of fibreglass-supported TiO_2 (through sol–gel method) was evaluated, demonstrating, moreover, that the same catalyst can be reused several times.
- Comparison of the efficiency of a new reactor (Double-Skin Sheet Reactor) with the existing PSA-CPC field.
- The photo-Fenton reaction has proven to be an alternative to TiO_2 processes in a broad range of industrial waste waters. Total degradation (measured as TOC) of pesticides and olive mill waste water with Photo-Fenton catalyst (mixture of Iron and H_2O_2) is possible in PSA reactors. These very promising results have opened a whole new field of PSA Detoxification Projects.
- Photocatalytic degradation of 2,4-dichlorophenol using CPCs and a new flat reactor. A new model has been proposed to relate the amount of radiation entering CPCs to radiation measurements. It has also been demonstrated that the flat reactor is only 50% less effective than CPCs.

These results have motivated the preparation of this special issue of *Catalysis Today (Solar Catalysis for Water Decontamination)* containing 16 articles.

References

- [1] D.M. Plaza (Ed.), Proc. 1st Users Workshop. Training and Mobility of Researchers Programme, Plataforma Solar de Almería, CIEMAT, Madrid, Spain, 1998.
- [2] D.M. Plaza (Ed.), Proc. 2nd Users Workshop. Training and Mobility of Researchers Programme, Plataforma Solar de Almería, CIEMAT, Madrid, Spain, 1999, in press.
- [3] D.M. Plaza (Ed.), Lessons on Solar Thermal Electricity Generation. A 'Summer School' within the 'Training and Mobility of Researchers Programme', Plataforma Solar de Almería, CIEMAT, Madrid, Spain, 1999, in press.
- [4] D.M. Plaza (Ed.), Lessons on Industrial Applications of Solar Chemistry. A 'Summer School' within the 'Training and Mobility of Researchers Programme', Plataforma Solar de Almería, CIEMAT, Madrid, Spain, 1999, in press.

Diego Martínez-Plaza, Sixto Malato-Rodríguez
Plataforma Solar de Almería (CIEMAT).
 Ctra. Senes km 4, Tabernas, Almería
 04200, Spain