International Journal of Photoenergy

Special Issue on
New Materials for Photocatalysis

CALL FOR PAPERS

Immediately after World War II, and the tragedies of Hiroshima and Nagasaki, scientific investigations on radiation chemistry (the effect of ionizing radiation on water and aqueous solutions, as well as on materials of biological interest) began to grow sharply, especially during the late 50s and the 60s, up to the 70s of the past century (Allen, (1961); M. Haissinsky's papers and books, particularly the series *Actions Chimiques et Biologiques des Radiations,* Masson & Cie, Paris (France) (1958–1970)). During these years detailed knowledge was gained on radiolysis of water, on primary radical species produced, such as H, HO_2, and OH radicals, on their kinetics of reaction with chemical species, on their thermodynamics, on their abilities to give rise to other radical species, enhancing the experience of radical chemistry, and on their direct or indirect detection.

The time was thus ripe to extend investigations from ionizing to nonionizing radiation, from gamma rays or beta particles to light. What will be later called the *Honda-Fujishima effect* was hence discovered (A. Fujishima and K. Honda, *Nature* (1972)) concerning, more properly, electrochemical photolysis of water at a semiconductor electrode. Photocatalysis was thus born.

Since the beginning, titanium dioxide was experimented as one of the most stable semiconductors for photocatalysis, and its crystal structure (e.g., anatase versus rutile or brookite) was deemed to be the most important factor in determining efficiency. Only 35 years later, the importance of nanoparticles crystal phase and size was clearly rationalized (Journal of the American Chemical Society (2007)). This allowed, most recently, as a remarkable advancement, a better understanding, through comprehensive ESR investigations, of different photogenerated defects, resulting in enhanced charge separation, and consequent increase of reactivity efficiency of titania nanocrystals, used in either slurry or conveniently immobilized onto suitable porous substrates (International Journal of Photoenergy (2015); The Journal of Physical Chemistry C (2015)).

Application of photocatalysts for energy conversion (photoelectrochemical cells) and for environmental purification, by exploiting the strongly oxidizing radicals produced, has received, since the early 70s of the past century, fast growing, almost exponential, attention. The various and numerous sides of photocatalytic materials, and the influence of many factors, have been explored, from doping to immobilization, from surface engineering to activity, from modeling to process engineering, and from supporting structures to reactors. Much information has been harvested, but much more progress in scientific and applied research waits to be reached and learned. Environmental problems and challenges, particularly, are becoming more serious day by day. Therefore, we feel the urgency of publishing a special issue, converged on design and application of photocatalysts, with special focus on new materials, their activity, and characterization.

Potential topics include, but are not limited to:

- New materials for photocatalysis
- New materials for visible light photocatalysis
- New materials for environmental purification through photocatalysis
- New materials for solar energy conversion through photocatalysis
- New materials for CO_2 reduction/oxidation through photocatalysis
- Solar energy conversion
- Environmental applications
- Influence of the various variables on concentration of photogenerated defects
- Cases resulting in enhanced charge separation and improved photocatalytic properties
- Kinetic modeling and reactor engineering

Authors can submit their manuscripts via the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/ijp/nmp/.

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