International Year of Light 2015

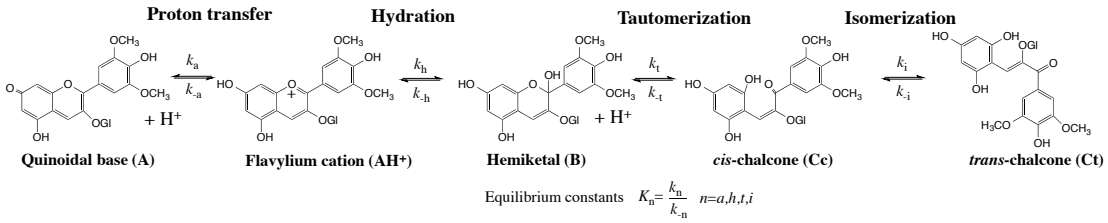
Appunti di Fisica '15
&
Dottorato di Ricerca in Fisica

29 Aprile ore 15:00
Sala seminari, CNR-IPCF

Chemistry and applications of Flavylium compounds: *a handful of colours*

Fernando Pina
(LAQV, REQUIMTE, Departamento de Química, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Portugal)

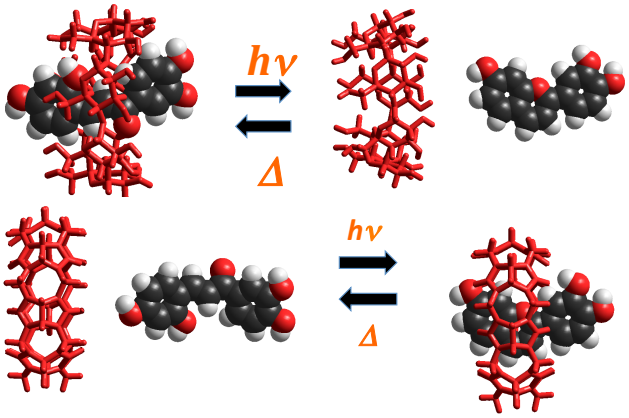
Flavylium multistate systems comprise anthocyanins the dyes responsible for most of the red and blue colour of flowers and fruits. The several forms of the multistate system can be reversibly interconverted by external stimuli,[1-5] such as pH, light, temperature and redox, Scheme 1.



Scheme 1. Network of chemical reactions of the anthocyanin oenin.

While anthocyanins do not present significant photochemistry, some synthetic flavylium compounds exhibit photochromism. The photochromic properties arise from the photo-induced *trans* to *cis* isomerization and more recently we discovered that it is possible to profit from the photo-induced ring opening/closure of the hemiketal[5]. The photochromism of the flavylium system is observed in micelles, polymers, gels and ionic liquids[4]. It can be used to write-read-erase. Moreover, it

is possible to complex the flavylium system with cyclodextrins and cucurbiturils and empty or load the flavylium from the cavities by means of light[6].



Examples of the use of these dyes as light absorbers for solar Cells will be also presented[3].

References

[1] F. Pina, M. J. Melo, C. A. T. Laia, A. J. Parola, J. C. Lima, *Chem. Soc. Rev.*, **2012**, *41*, 869-908.
[2] F. Pina, M. J. Melo, M. Maestri, P. Passaniti, V. Balzani, *J. Am. Chem. Soc. J. Am. Chem. Soc.* **2000**, *122*, 4496-4498.
[3] G. Calogero, A. Sinopoli, I. Citro, G. Di Marco, V. Petrov, A. M. Diniz, A. J. Parola, F. Pina, *Photochemical & Photobiological Sciences*, **2013**, *12*, 883-894.
[4] F. Pina, J. C. Lima. A. J. Parola, C. A. M. Afonso, *Angew. Chem. Int. Ed.* **2004**, *43*, 1525-1527.
[5] S. Gago, N. Basílio, A. Moro, F. Pina, *Chem. Commun.* **2015**, accepted DOI: 10.1039/C5CC01677K.
[6] V. Petrov, S. Stanimirov, I. K. Petrov, A. Fernandes, V. de Freitas, F. Pina, *J. Phys. Chem.*, **2013**, *117*, 10692-10701.