Functional dyes: from synthesis to applications

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The term "*functional dyes*" has been used to indicate dye or pigment molecules developed for purposes other than the classical coloration of substrates. Starting from the two seminal International Symposium on Functional Dyes on the early nineties the development of this frontier research has been very fast and resulted in the main research line for colorist both in academia and industry starting from the mid nineties.

In this contribution will be presented some example of functional dyes (from UV to IR absorbing dyes), which are useful for hi-tech applications and that were recently developed in our laboratories. Emphasis will be paid to the design of dye molecules[1] and the synthetic approaches (Figure 1)[2] needed for the specific application (ranging from optoelectronics, i.e. Dye-sensitized solar cells, DSCs,[3] or light emitting cells, LEC,[4] to biomedical applications, such as photodynamic therapy, PDT[1], for the treatment of cancer and fluorescent sensors).

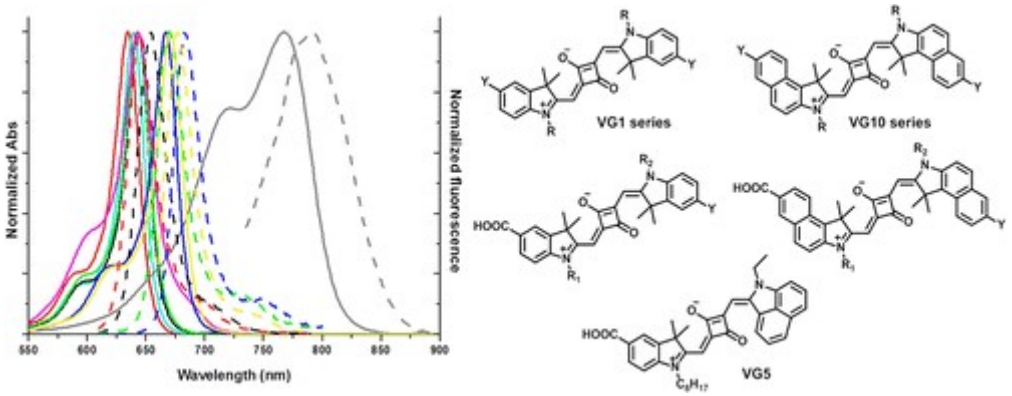

Figure 1: absorption spectra and molecular structures of a series of IR functional dyes for high-tech applications

[1] Barolo, C.; Yum, J.; Artuso, E.; Barbero, N.; Di Censo, D.; Lobello, M. G.; Fantacci, S.; De Angelis, F.; Graetzel, M.; Nazeeruddin, M. K.; Viscardi G. *ChemSusChem* **2013** *6*, 2170-2180

[2] Barbero, N.; Magistris, C.; Park, J.; Saccone, D.; Quagliotto, P.; Buscaino, R.; Medana, C.; Barolo, C.; Viscardi, G. *Org. Lett.* **2015** *17*, 3306-3309.

[3] Saccone, D.; Galliano, S.; Barbero, N.; Quagliotto, P.; Viscardi, G.; Barolo, C. *Eu. J. Org. Chem.* **2016** *13*, 2244-2259.

[4] (a) Weber, M. D.; Garino, C.; Volpi, G.; Casamassa, E.; Milanesio, M.; Barolo, C.; Costa, R. D. *Dalton Trans.* **2016** *45*, 8984-8993. (b) Volpi, G.; Garino, C.; Conterosito, E.; Barolo, C.; Gobetto, R.; Viscardi G. *Dyes and Pigments* **2016** *128*, 96-100.