Organic free radicals for electronic and magnetic functional surfaces

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The increasing interest in miniaturizing electronic devices to achieve denser circuits and memories will eventually entail the utilization of molecules as active components. In particular, thiol SAMs on metallic substrates have become suitable candidates for transport studies since one of the electrical contacts is straightforwardly obtained thanks to the sulphur-metal covalent bond. Another interesting topic of *Molecular Electronics* is the development of new switchable and bistable systems based on electroactive molecules grafted on surfaces.

Here, we describe the functionalization of Au, SiO_2 and ITO surfaces with appropriately functionalized polychlorotriphenylmethyl (PTM) radicals and their non-radical polychlorotriphenylmethanes (αH-PTM) analogous, as well as the different characterizations of the resulting SAMs.[1-3] The ensuing two kinds of structurally related SAMs, one having open-shell molecules, the PTM SAMs, and other with closed-shell ones, the αHPTM SAMs, have permitted to study the influence of such electroactive molecules in the electron transport through these molecular junctions. To investigate these molecular junctions, we have used the conductive scanning force microscopy (C-SFM) revealing that the electron transport is dramatically enhanced in the PTM SAMs due to the particular electronic structure of such molecular junctions.[3] Molecular switches based on PTM SAMs have also been investigated in detail.

[1] N. Crivillers, *et al*., Angew. Chem. (2007**)** 46, 2215.
[2] N. Crivillers, *et al*., J. Am. Chem. Soc. (2008**)** 130, 5499.
[3] N. Crivillers, *et al*., Adv. Mater. (2009) 21, 1177