From Molecular Wires to Functional Materials

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The concept of molecular wire is approached in my laboratories studying the photophysical and electrochemical behavior of donor-bridge-acceptor systems (so-called dyads, triads etc.). In such studies, several types of one-dimensional molecular bridges have been shown to act as efficient mediators of electron (or energy) transfer between donor and acceptor units. We are focussing on the use of metal complexes as electron donor or acceptor groups and on conjugated bridging ligands as wire units. The use of different geometrical arrangements of the bridging ligand will be discussed in relation with the change on the rate of photoinduced electron transfer processes. Some preliminary results on the inclusion of metal complexes in polymeric matrices, relevant to the construction of opto-electronic devices, will also be Photoin systems where such properties can be modified in a programmed way by an external action. If the change induced in the electron mediating properties of the bridge is very large, such systems can be devised. Two examples of systems containing a switching unit will be given.