ELECTRON AND ENERGY TRANSFER PROCESSES IN FULLERENE-BASED DONOR-ACCEPTOR ENSEMBLES

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An important aspect in fullerene containing donor acceptor assemblies, which has been, however, drawn minor attention, implies the fullerene's energetically low lying excited states. Therefore, fullerenes, which are considered to be excellent electron acceptors, for example, in artificial photosynthesis mimics, are also potential energy traps, generating singlet and triplet excited states in high quantum yields. Consequently, energy transfer events often accompany electron transfer processes. This competitive pathway plays a crucial role, especially in non-polar media, while it is seen less frequent to dominate the deactivation of a photoexcited chromophore in polar surroundings. The most important concern is that a highly efficient energy transfer lowers the quantum yield of charge separation, by far the most important criterion for the performance of a model system in artificial photosynthesis.

In the present contribution, we describe a number of new synthetic model systems, in which a number of parameters such as donor-acceptor separations, oxidation and reduction potentials of the donor-acceptor couples, excited state energies of the chromophore molecule and solvent polarity are systematically altered. The incentives are twofold: First, to impact the overall thermodynamics (*i.e.*, facilitate or retard intramolecular electron transfer processes). Secondly, to influence the competition between energy and electron transfer events (*i.e.*, shifting it from energy to electron transfer).