Electron transfer dynamics in dye sensitised solar cells

James R Durrant

Department of Chemistry, Imperial College, London SW7 2AY, U.K. Email: <u>j.durrant@ic.ac.uk</u>, fax: 44 20 7594 5801

Studies of photoinduced charge separation in supramolecular systems have shown that achieving a high yield of long lived, energetic charge separated state requires careful optimisation of system design. Optimisation typically requires a compromise between conflicting constraints with, for example, increased electronic coupling favouring a high charge separation yield but at the expense of lifetime of the charge separated state.

In this paper we will apply such considerations to the optimisation of interfacial electron transfer dynamics in dye sensitised, nanocrystalline solar cells. Issues which to be addressed will include:

- What are optimum electron transfer dynamics for device efficiency what do we want?
- What are optimum approaches to modulate these electron transfer dynamics how do we get there?
- To what extent is device optimisation limited by inhomogeneity in the kinetics and energetics of interfacial electron transfer what are the fundamental limits to optimisation?