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## Charge photogeneration and recombination in dye sensitized and polymer / fullerene solar cells

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My lecture will focus on materials design for polymer/fullerene and dye sensitized solar cells. Experimentally we will focus on the primary process of charge separation and recombination in such excitonic solar cells. I will start of considering the energetics and kinetics of charge photogeneration. Concerning charge photogeneration, I will focus on the energetic cost of charge photogeneration, and its impact upon device efficiency. Topics I intend to address include triplet versus singlet injection, overcoming the coulomb attraction of photogenerated charges, the minimization of kinetic redundancy and a comparison of charge separation limitations upon device performance between different sensitiser dyes and polymers. I will then go on to consider recombination losses in such devices - including quantification of bimolecular recombination losses, transport issues and interface engineering approaches to reduce recombination losses. A key consideration will be the role of energetic disorder and crystallinity in influencing charge carrier dynamics and interfacial energetics.