

Plasmonic dye-sensitized solar cells

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Fossil fuels are slowly running out and their major combustion product CO_2 is starting to strongly affect our planet's climate. We are therefore in urgent need of alternative energy sources. Solar cells are a viable option to cover our future energy needs. However, to do so, they need to be low-cost and efficient. Dye-sensitized solar cells (DSCs) are simple and cheap to manufacture, while showing overall solar energy conversion efficiencies of up to 11%. Our team of 17 researchers at Monash University focuses on novel aspects of DSCs including multi-junction solar cells, plasmonic solar cells (exploiting the plasmon absorption of metal nanoparticles) and flexible solar cells.

Aim of the project:

One of our current research interests is the use of metal nanoparticles as antenna systems to harvest photons and transfer their energy to a sensitising dye in a DSC. The study involves the synthesis of metal nanoparticles, their surface functionalisation, their assembly onto sensitised semiconductor surfaces and the spectroscopic study of energy transfer processes in these systems. For further questions please contact Udo (see above) or Philipp (PhD student, philipp.reineck@eng.monash.edu).

Emphasis: Experimental 100%

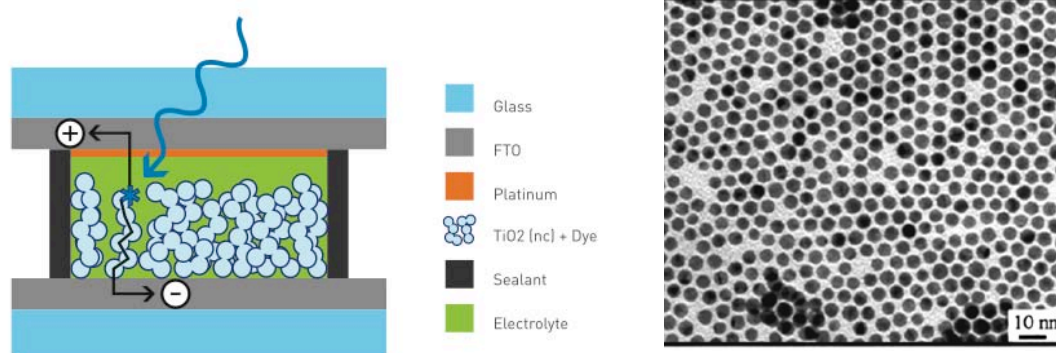


Figure 1. (left) Cross-section diagram of a dye-sensitized solar cell, (right) TEM of gold nanoparticles.