Supplementary Material

Plasmid Nicking Assays

DNA (pBlueScript phagemid vector) was received from Stratagene, and transformed into *E.Coli* XL1 blue competent cells. The DNA was then extracted using a Sigma GenElute endotoxin-free maxiprep plasmid purification kit, and then eluted into 10 mM Tris-HCl, 1 mM EDTA at pH 7.5.

The DNA was then exchanged into 10 mM phosphate buffer, pH 7.5. 50 µl of DNA solution was mixed with either 10 µl phosphate buffer solution (blank) or 10 µl quantum dot solution (Qdot 605 biotin conjugate, obtained from Cambridge Bioscience, UK)

The samples were then illuminated under a xenon arc lamp solar simulator for 60 minutes (The output for the solar simulator was 10 mW cm^{-1} between 290 and 400nm, Figure 1 for plot of actual ouput).10 µl were removed every 15 minutes (including 0 mins). The DNA was precipitated by addition of 100 % ethanol (33 µl), 3M sodium acetate (1 µl) and incubated in a -80 °C freezer for 1 hour. (Failure to separate the dots and the DNA lead to bands in the assay that were unresolvable.) The isolated DNA was then centrifuged, washed with 70 % ethanol and dried. This was then re-suspended in 10 µl phosphate buffer. The solution was then loaded onto a 1% agrose gel and run at 200 V for 90 minutes. The gel was stained with ethidium bromide and visualised using a UV transilluminator. The intensity of the bands was calculated using AlphaDigiDoc software (Alpha Innotech Corporation).

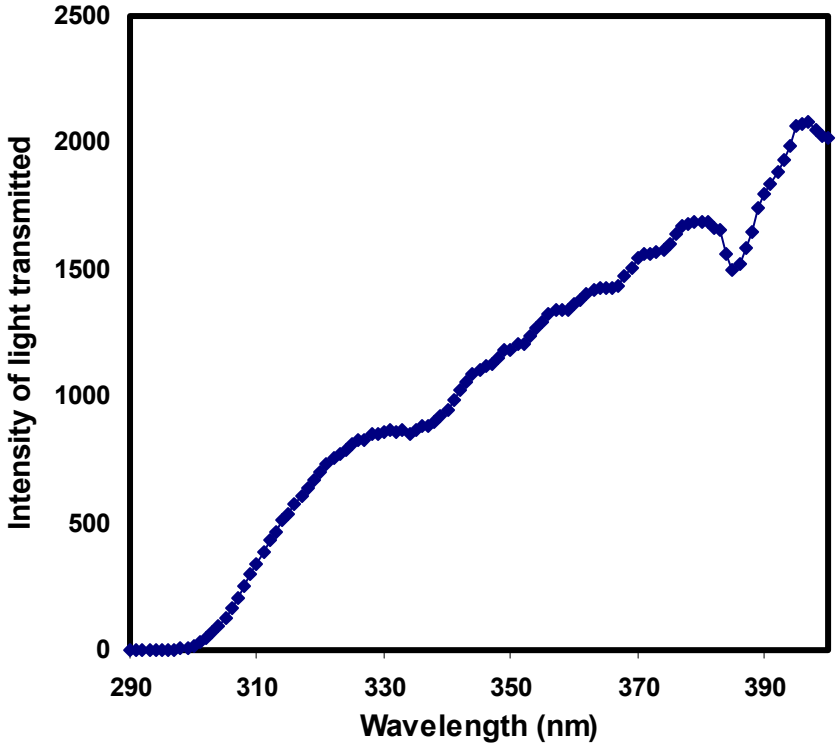


Figure 1 – Plot of output of solar simulator

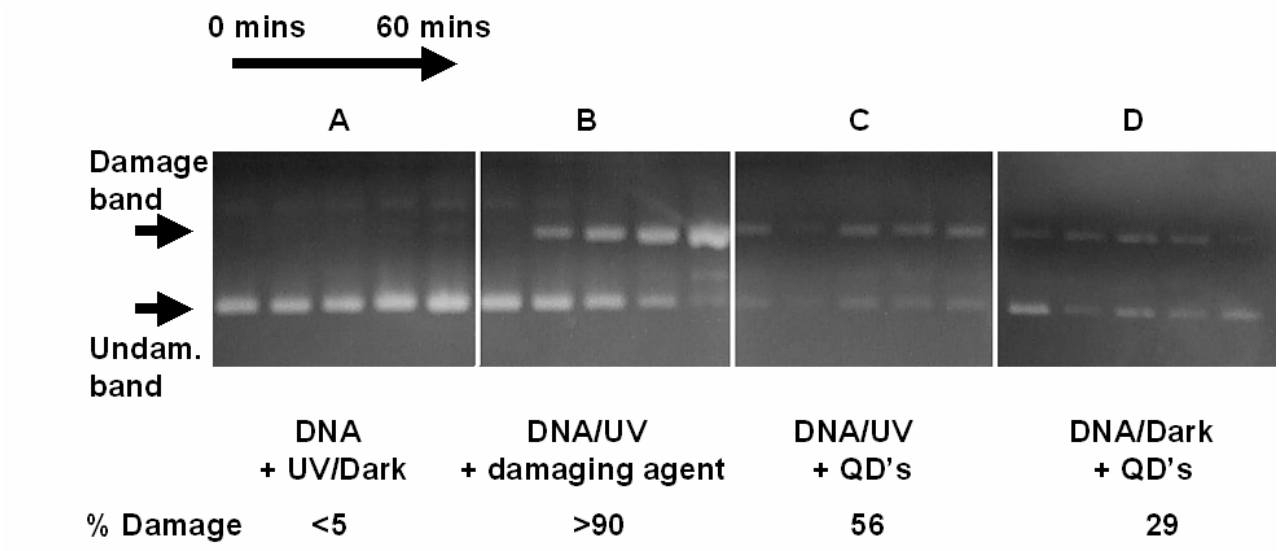
Spin Trap experiments

CdSe/ZnS nanomaterials were prepared under an inert atmosphere by the thermolysis of cadmium acetate and tri-*n*-octylphosphine selenide in tri-*n*-octylphosphine oxide (Peng *et al*., *Nano Letters*, 2001, 1, 333). An aliquot was taken for PL comparisons. The shell was added by addition of $[Zn(S_2CNMeHex)_2]_2$ in tri-*n*-octylphosphine (Ludolph *et al*. *Chem Comm*, 1998, 1849) yielding CdSe/ZnS quantum dots with a quantum yield of *ca.* 30 % (estimated against rhodamine dye). The phase transfer was carried out as described by Mikulec (PhD thesis, MIT, 1999) CdSe/ZnS quantum dots (0.06 g) were washed with dry methanol, and dried under N_2. 11-Mercaptoundecanoic acid (0.1 g) was mixed with the washed dots under a N_2 atmosphere and heated at 70 °C for 150 minutes. The solid was left to cool and dissolved in 0.15 g DMF. To this was added 0.1 g potassium *tert*-butoxide in 5 g

DMF, causing an immediate precipitate. A further 5 ml DMF was added and the gel isolated by centrifugation. The gel was washed with 3 x 10 ml DMF and dried under a N_2 flow. The gel was readily water-soluble and retained its luminescent properties. Similar experiments with CdSe quantum dots with high quantum yields resulted in almost complete quenching of the photoluminescence. The gel was stored under N_2 prior to use.

Varying amounts of CdSe/ZnS were dissolved in deionised water, usually maintaining the first excitonic peak at an absorbance value of 0.1 (1 cm cell). 20 µl of the quantum dot solution was mixed with 20 µl of 0.5 M DMPO (5,5-dimethyl-1-pyrroline *N*-oxide) solution and loaded into a quartz cell. Excitation of samples was achieved by placing the sample 50 cm away from a Xenon lamp, including a Schott WG320 light filter giving a spectrum comparable to that of sunlight. The light intensity falling on the grating in the range 290-400 nm was 2 mW/cm^2. Samples were run on a Bruker ESP 3000.

Details of figure 1



Supplementary Material (ESI) for Chemical Communications