SUPPORTING INFORMATION FOR

Polystyrene Bead-Based System for Optical Sensing Using Spiropyran Photoswitches

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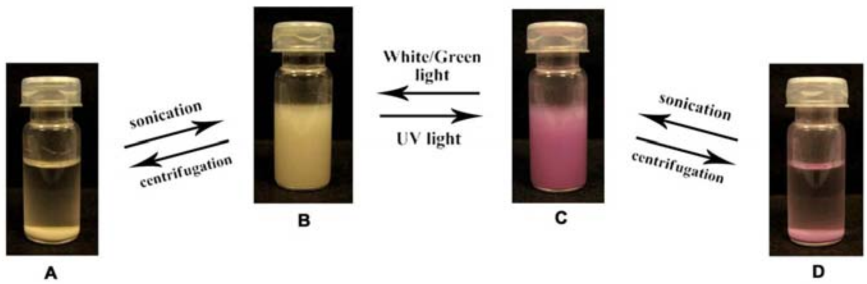
Optical properties of spiropyran coated microbeads:

(a)



(b)

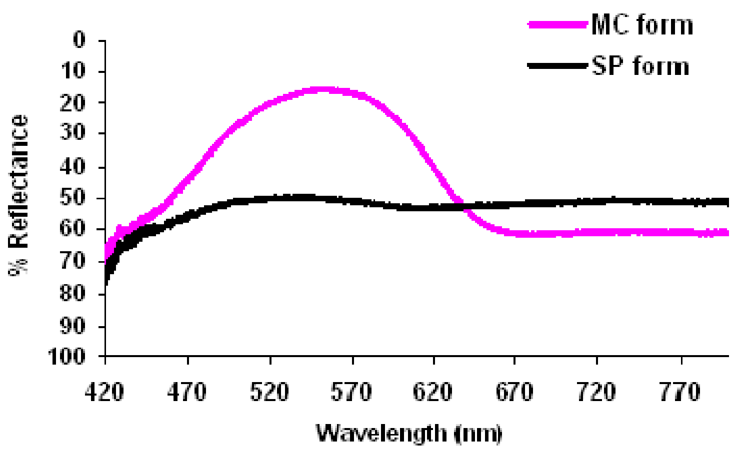


Figure S1: (a) Polystyrene microbead sample spiropyran functionalised via an 8-carbon covalent tether (0.01 g in 1.3 ml ethanol) in a glass vial is switched between the colourless spiro (SP) form and the purple merocyanine (MC) form. From the left: (A) Sedimented white spiropyran functionalised microbeads layer after centrifugation; (B) Microbeads suspension exposed to one minute of white light; (C) Microbeads suspension exposed to one minute of UV light; (D) Sedimented purple beads layer after centrifugation (all the samples are in ethanol).

The centrifugation process demonstrates that the colour change is happening on the microbead surface and not in the solution medium.

(b) Reflectance spectra of the MC and the SP forms on the microbead surface obtained using the in-house designed holder.

Influence of solvents on MC→SP conversion: percent error of first order kinetic curves

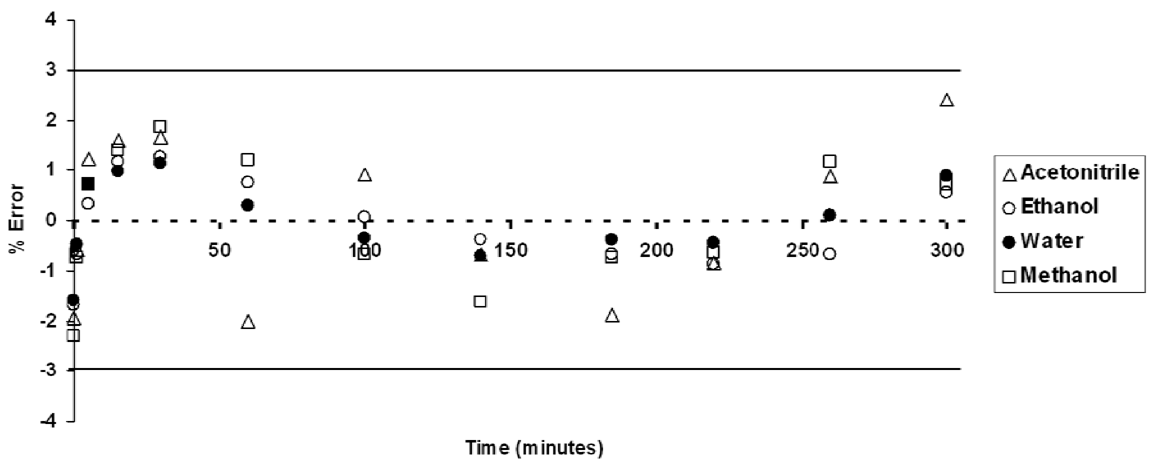


Figure S2: The residual error calculated between the data and the model in between does not exceed 3% at any point in the fitted curve.

Photostability evaluation of the surface immobilised spiropyran

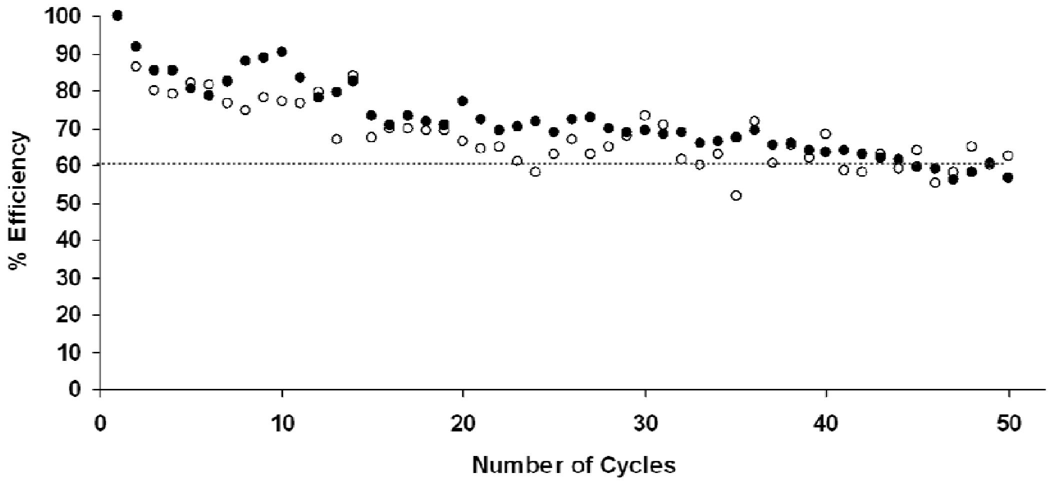


Figure S3: Decrease in switching efficiency of two samples of spiropyran functionalised microbeads (0.01 g suspended in 1.3 ml of ethanol) via an 8-carbon covalent tether (dotted and full circles) after 100 switching events. The efficiency was evaluated monitoring the reflectance value at 560 nm, according to the reported formula, showing a decrease of 40% after 50 cycles.