Supporting Information for

Pyrene nanoparticles as a novel FRET probe for detection of Rhodamine 6G: Spectroscopic ruler for textile effluent.

Dhanaji P. Bhopate, Prasad G. Mahajan, Kalyanrao M. Garadkar, Govind B. Kolekar, Shivajirao R. Patil*

Fluorescence Spectroscopy Laboratory, Department of Chemistry,
Shivaji University, Kolhapur-416 004, Maharashtra (India).

Fluorescence spectra of R6G solution without pyrene nanoparticles suspension of same concentrations those used in FRET experiments with pyrene nanoparticles was recorded at excitation wavelength 354 nm shown in Fig. S1. It is seen that R6G has negligible fluorescence at 354 nm excitation when compared with its fluorescence in the presence of pyrene nanoparticles due to FRET. Hence rules out the possibility of direct excitation of R6G at excitation on wavelength of PyNPs

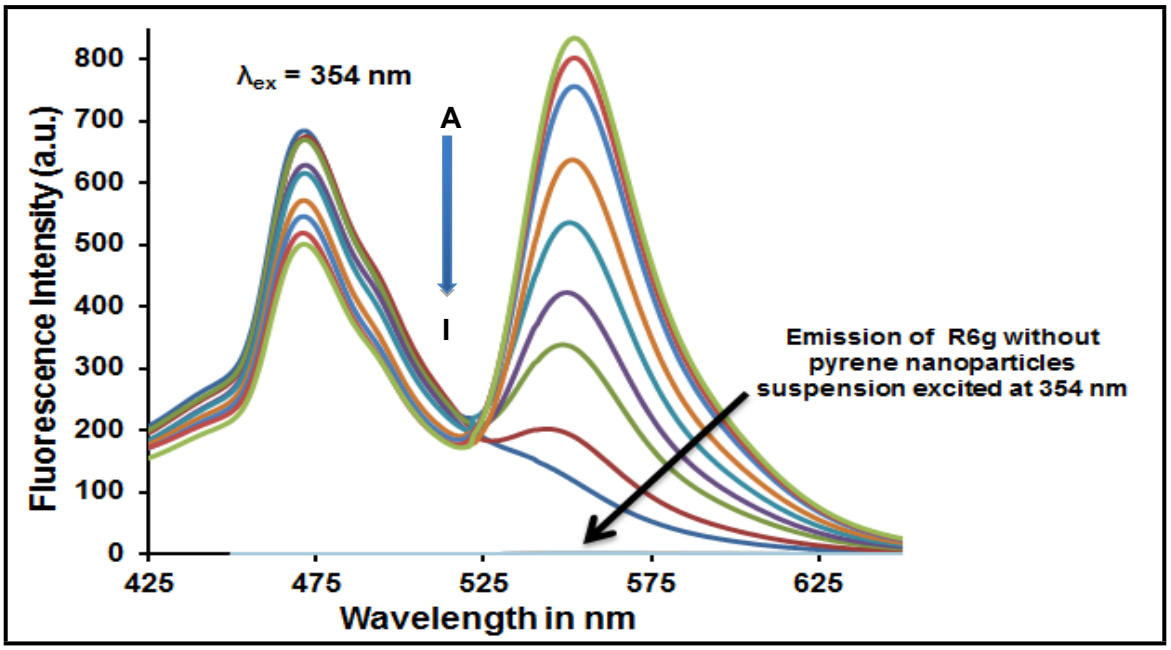

Fig. S1 Fluorescence quenching of pyrene nanoparticles (1.36×10^{-4} mol•L^{-1}) with varying amounts of rhodamine 6G spectra A to I (0.0 to 8×10^{-6} mol•L^{-1}).

From Fig. S2 it is clear that there is no change in the spectral characteristics of PyNPs and R6G, which means these two types of molecules retain their identity in the mixtures. This suggests that there is no ground state complex formation and hence rules out the possibility of static quenching[1].

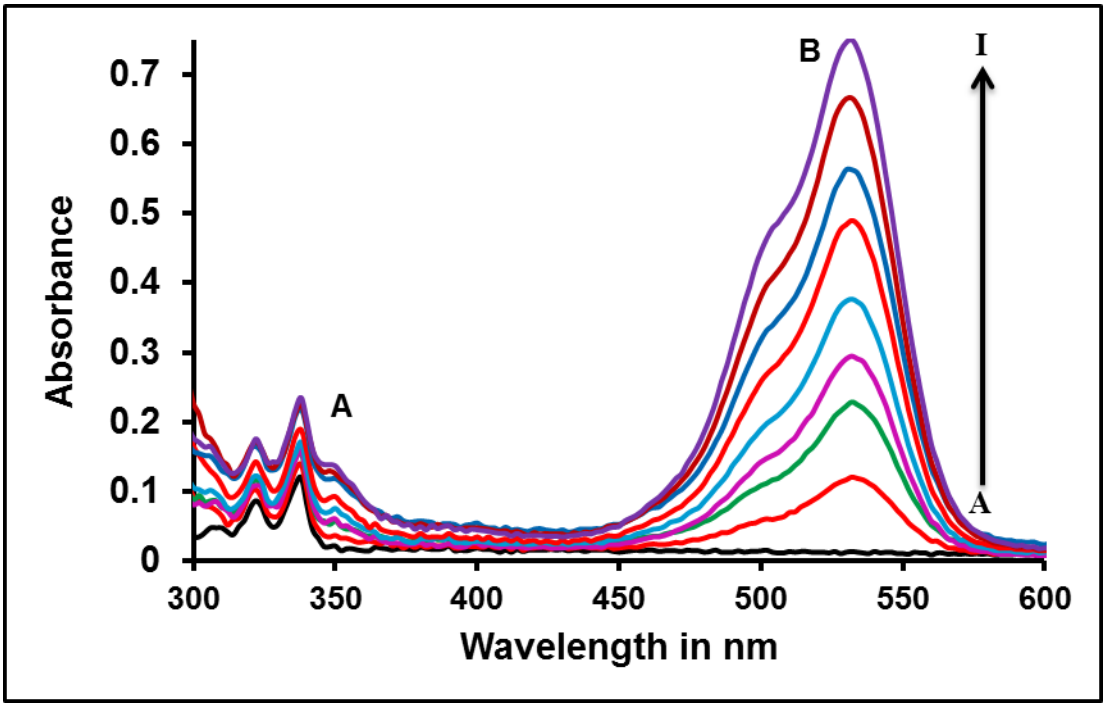

Fig. S2 Absorption spectra of mixtures of PyNPs [spectrm A] and R6G [spectrum B]: [PyNPs] = 1.36×10^{-4} mol•L^{-1} and [R6G] concentration variation from 0.0 to 8×10^{-6} mol•L^{-1}.

The decrease in fluorescence lifetime of PyNPs from 6.5 ns to 3.5 ns and 2.5 ns upon addition of 4×10^{-6} mol•L^{-1} and 8×10^{-6} mol•L^{-1} R6G solutions respectively supports efficient FRET from PyNPs to R6G[2]. The fluorescence lifetime of PyNPs with and without R6G are obtained from the fluorescence decay profile presented in Fig. S3.

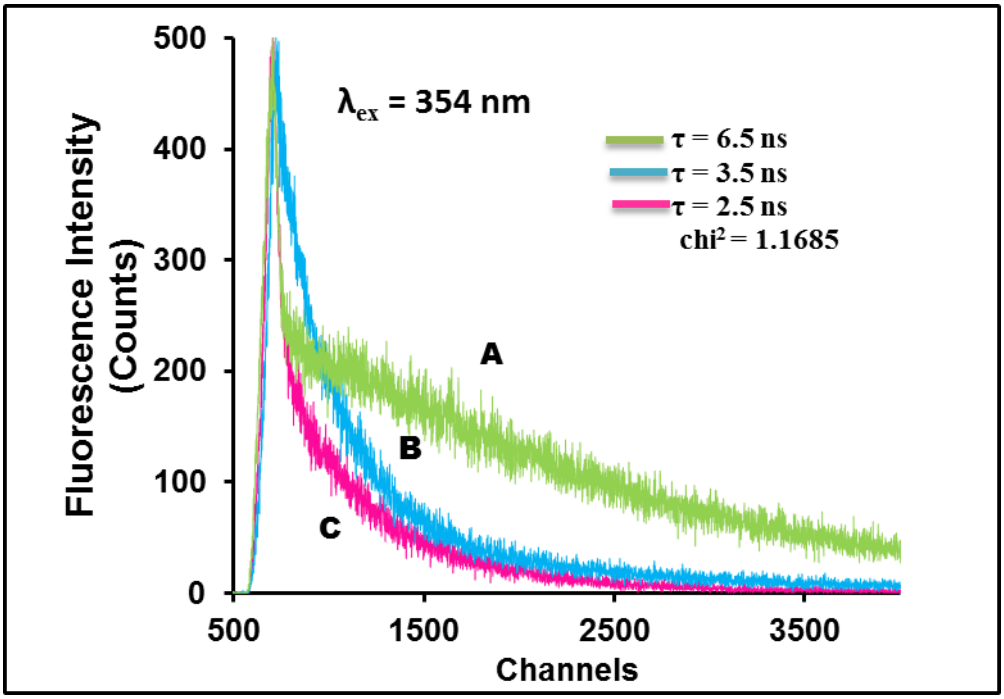

Fig. S3 Representation of the life time spectra of PyNPs and their variation in response to the addition of R6G concentrations to PyNPs suspension (1.36×10^{-4} mol•L^{-1}): (A) in the absence R6G, and (B) and (C) in the presence 4×10^{-6} mol•L^{-1} and 8×10^{-6} mol•L^{-1} R6G respectively.

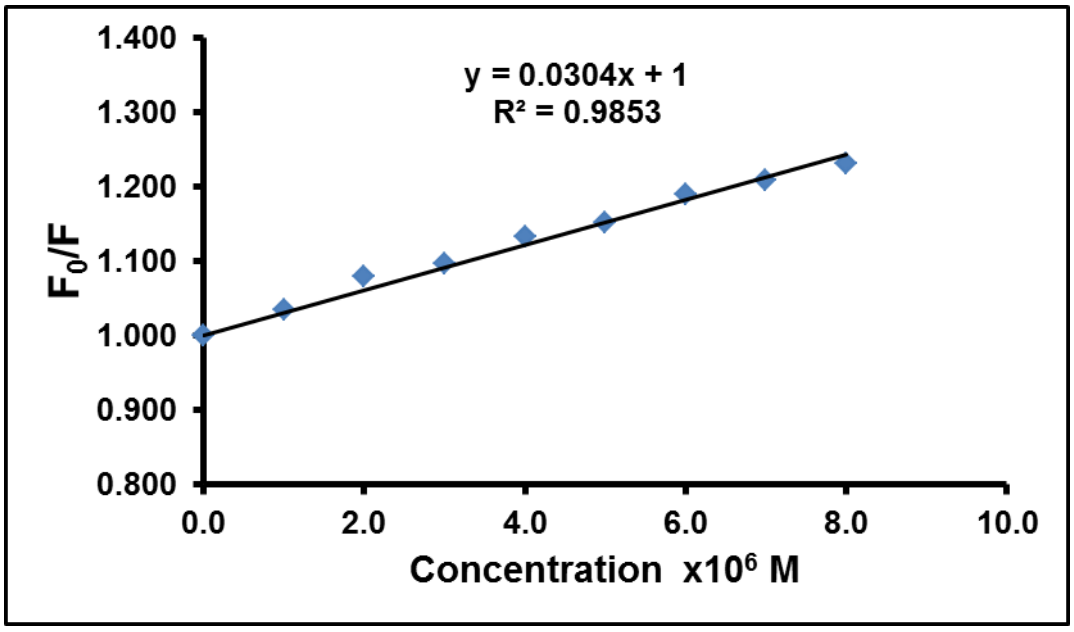

Fig.S4.Calibration Stern-Volmer plot of F_0/F versus concentration of R6G shows that the system is linear.

References:

1. U.S. Mote, S.R. Patil, S.H. Bhosale, S.H. Han, and G.B. Kolekar, *J. Photochem. Photobiol. B: Bio*., 2011, **103**, 16–21.

2. A. J. Ozinskas, H. Malak, J. Joshi, H. Szmacinski, J. Britz, R. B. Thompson, P. A. Koen and J. R. Lakowicz, *Anal Biochem*., 1993, **213**, 264-270.