**Due to new requirements on formatting issued by the Journal of Physical Chemistry effective June 1, 2013, we are sending you a checklist to assist you in revising your manuscript formatting.  
  
The following items need to be corrected.**  
**1) Reference formatting is incorrect. (#10-11-12-13 on the checklist)  
   
    (a) Article Titles are now required with ALL titles to be written in title case.  
    (b) Last Page numbers are required.**

These items have been fixed, and are marked in red in the markup document.

**2) Figure 4 is not mentioned in the text.  
  
3) Figure 6 is mentioned (pg 14) not is not shown.**  
The mention of Figure 6 was supposed to read “Figure 4,” and has been fixed in the manuscript, which should address both items 2 and 3.  
  
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**Reviewer(s)' Comments to Author:  
  
Reviewer: 1  
  
Recommendation: This paper is publishable subject to minor revisions noted.  Further review is not needed.  
  
Comments:  
This work reports experimental study of exciton transport in conjugated polymers using a doping dye molecule as a probe with time-resolved fluorescence.  A diffusion model was used to account for the key features and determine the diffusion length of interest.  The work is well designed and carefully executed.  The results are of good quality and the analysis is thorough and insightful.**  
**I only have one minor question for the authors to consider: in the model, is dye is probably assumed to be very small, equivalent to a point.  Is it possible to include a finite size of the dye molecule in the model?  In relation, since the dye does have a finite size, could or how would this affect the data interpretation?**

The simulations use a continuum model to handle the structure of the polymer. While the dyes are essentially points within this continuum, they are given some finite volume via the calculated Förster radius, which can be converted into a volume. As excitons propagate along the continuum, the probability of exciton transfer increases as the exciton moves nearer to one of the dye points. Giving the dyes a finite size would increase the Förster radius marginally (the effect of changing the Förster radius on simulation results is outlined in the SI), but also slow down computing times due to adding a granular element (the dye size/shape) to the continuum. This will be mentioned in the Supporting Information.

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**Reviewer: 2  
  
Recommendation: This paper is publishable subject to minor revisions noted.  Further review is not needed.  
  
Comments:  
Manuscript entitled “Measurement of Exciton Transport in Conjugated Polymer Nanoparticles” by McNeill and coworkers reported is an important and eligant method for assaying the exciton transport in conjugate dye dopred polymer nanoparticles. Experimental as well as the simulations are carefully performed and the conclusions are resonable. The result presented here will shed light in the fundamental photophysics of CNP and their application in making photovoltaic devices and single fluorescence emittor.  
I recommend this manuscript for publication in JPC.  
I have following comments on this manuscript:**

**Major comments:**1. **The percentage of dopant inside the CPN is completely determined based on the concentration ratio of dopant and CPN. Percentage of dye doping is based on the assumption of “…. expecting most of the dye is incorporating into the CPN….” For the homogeneity of the sample they used brief sonication. Authors need to make comments on the homogeneity and elaborate the CNP preparation procedure mentioning sonication time, frequency for sonication, temperature etc. How the authors assumed that all the dyes were incorporated into the core? Is there any experimental proof that all the perelene dyes were incorporated into the core ?**

The sonication time of our sample is ~30 s at 40 kHz and room temperature. In our 2008 J. Phys. Chem. C publication, we performed centrifugation of a sample of Coumarin 6 doped polyfluorene CPNs and measured the absorbance and fluorescence of the filtrate. Negligible absorbance and very weak fluorescence from Coumarin 6 was observed, indicating that the majority of the dye is embedded in the polymer matrix. The process was repeated a few weeks later and no dye leakage was observed. Given that the molecular weight of the PFBT copolymer is a factor of 3 less than the polyfluorene polymer used in the above mentioned article, and the perylene red dye is at least as large, if not slightly larger than Coumarin 6, we can expect similar results. This will be mentioned in the Supporting Information.

**2. For simulation a modelling of exciton diffusion and energy transfer are imported here. To obtained the desired result they varied several parameter but they assumed the nanoparticles as a sphere only and they gave priority to quenching by defects- but why they only restricted the simulation with spherical particle and quenching by defects only? Apart from AFM is there any indication that the CNP are spherical?**

Due to the observations that quantum yield and lifetime are drastically reduced in transition from PFBT in good solvent to undoped CPNs, it is assumed that a large number of defects are introduced into the system, in the forms of chemical defects and/or hole polarons. Before taking into account the effect of quenching due to dye dopants, we opted to first quantify the effective number of defects expressed as dye equivalents.

Apart from AFM, in our 2008 J. Phys. Chem. C publication, TEM was performed on polyfluorene CPNs, which indicated approximately spherical nanoparticle shapes. Given that half of the copolymer PFBT is polyfluorene, they are structurally similar, and can be assumed to adopt a similar nanoparticle shape. This will be added into the Supporting Information as well.

**Minor comments:  
3. Diffusion length LD = (2nDτ)1/2 , but author claim that the diffusion length increased by factor of two where the lifetime of excited state is reduced. This needs elaboration for the non-expert readers.**

The lifetime which is used to initially calculate LD is the unquenched exciton lifetime for PFBT. Once the diffusion length is set, the simulations are executed using that diffusion length, accounting for quenching by defects and the Poisson distribution of defects and dyes. The Poisson weighted average kinetics trace for a given amount of defects/dyes is then used to calculate lifetime (which is where the lifetime reduction is seen), and compared to experimental TCSPC results.

**4. Although there is red shift in the emission maxima but the quantum yield of CPN is getting lowered with the increment of dopant (perelene dye) amount, with this result how the author claims that such CPN is useful for multicolour imaging and tracking purpose?**

At low-to-moderate doping levels, the fluorescence quantum yield remains at or above 0.10. The dopant dye is highly photostable and possesses a quantum yield near unity in solution. The effect of the dye dopant on the photostability of the host polymer has yet to be measured. However, the photostability of the host polymer is already high (~109 photons emitted prior to irreversible photobleaching) and the photostability is expected to increase by at least an order of magnitude with dye doping due to the reduction in lifetime of the host polymer. As such, the exciton spends less time on the host polymer before FRET occurs, making other processes such as charge transfer or triplet quenching less accessible. This is an experiment we plan to execute in the near future.

**5.** **Fig 3a, undoped decay looks quite wavy in nature and is there any rise in the initial part?**

There is no rise in the intial part. The waviness apparent in the decay trace is possibly due to afterpulsing in the single-photon APD detector, stray reflections in the apparatus reaching the detector, or nonlinearities in the multi-channel analyzer (MCA) within the TCSPC setup. These effects are prominent only in samples with a lifetime greater than ~2 ns. The effect on the calculation of fluorescence lifetimes is minor, and has been cross-checked with several standard dyes, including fluorescein in 0.01 M NaOH (τ = 4 ns), Coumarin 6 in ethanol (τ = 2.5 ns), and perylene red in THF (τ = 5.6 ns). All lifetimes measured were within 10% of literature values. A paragraph addressing these concerns will be added to the Supporting Information.

**6. Fig 4b in the inset needs scale for X-axis.**

The x-axis is identical for both Figure 4b and the inset. I will make that more explicit in the figure itself.