Supplementary Information

Photobleaching induced time-dependent light emission from dye-doped polymer nanofibers

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1. The measurement of the optical power

Figure S1 shows the schematic of optical power measurement. A 473-nm light output from the fiber with an optical power of P_{ex} = 800 μW was irradiated on the pure polymer nanofiber with a diameter of 600 nm. The position A is in the center of the radiation area. The light coupled into the nanofiber was further propagated along the nanofiber and then picked up by a tapered fiber at the position B. Here, the tapered fiber is connected with an optical power meter. For convenient manipulation in the experiment, the distance between A and B was chosen to be 0.1 mm. Because of a high optical transparency (92%) of PMMA, the propagation loss along the PMMA nanofiber was 0.01~0.1 dB/mm [H. Q. Yu et al, *Sci. Rep.,* 2013, 3, 1674–1679] and thus it was negligibly small at the distance of 0.1 mm. The optical power measured by the tapered fiber was defined as P_{out}. Since the tapered fiber and the nanowire contacted tightly each other by the Van der Waals and electrostatic forces, the coupling efficiency η between the nanowire and the tapered fiber is estimated to be 90% [Ref. 20]. Hence, the optical power accepted by the nanowire $P_{in} = P_{out}/\eta$.

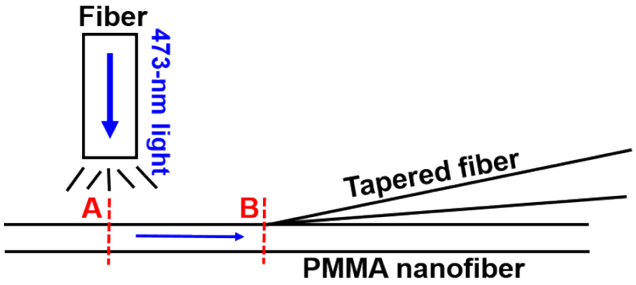

Figure S1. The schematic of optical power measurement

2. The temporal behavior of bleaching for different excitation power P_{ex} values

Figure S2 shows the absorbance of C6-LR305-codoped polymer nanofiber at a wavelength of 473 nm for three different P_{ex} of 400, 800, and 1600 μW. It can be seen that, with an increasing of P_{ex}, the absorbance decreases more quickly. As an example, when the excitation time t = 22 min, the absorbances at 473 nm decrease to be 69%, 45%, 25% at P_{ex} = 400, 800, 1600 μW, respectively. The results indicate that the bleaching is more efficient for higher P_{ex}, which is consistent with the reported results [Refs.15, 16].

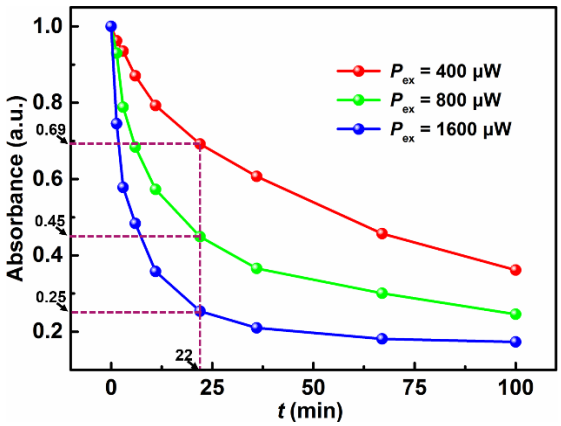

Figure S2. Absorbance of C6-LR305-codoped polymer nanofiber with a wavelength of 473 nm at three different excitation powers as a function of time

3. The photobleaching in the C6-LR305-codoped polymer films

Figure S3 shows the normalized PL spectrums of the C6-LR305-codoped polymer films (the mass ratio between the dyes and the PMMA is the same with that of the nanofiber) excited by 473 nm light at time t = 0 (black curve) and t = 57 min (red curve). The major emission peaks were 492 nm and 590 nm. After 57 minutes excitation, the shape and the peak of the spectrum stayed the same but only had a slight difference in the intensity, which reduced by 6% and 6.9% for 492 nm and 590 nm, respectively.

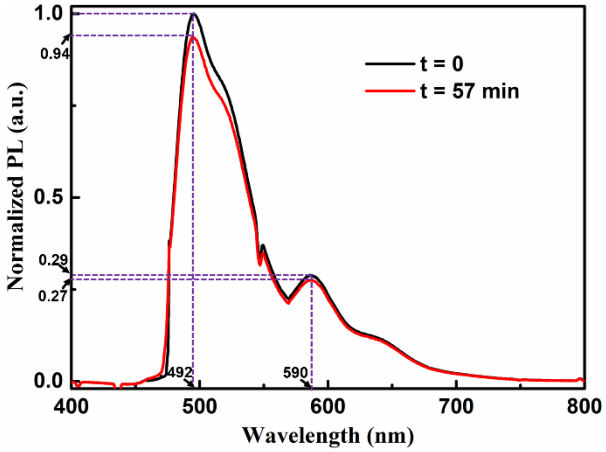

Figure S3. Normalized PL spectrums of the C6-LR305-codoped polymer films