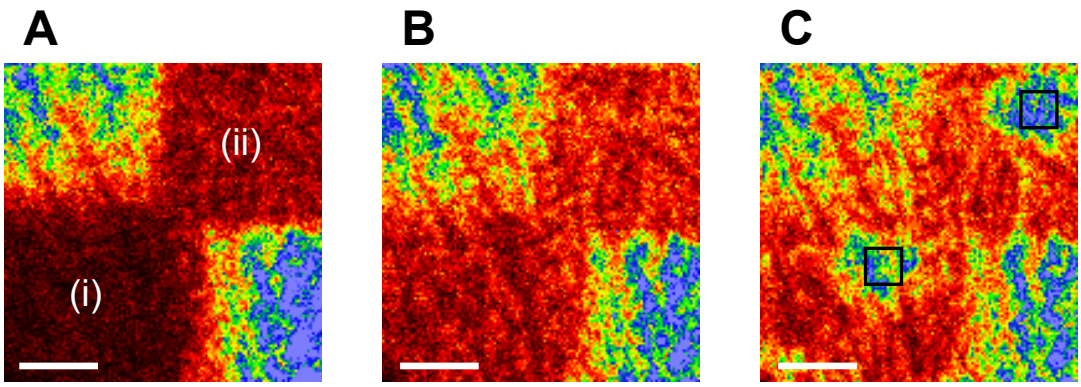

Figure S1 Fluorescence images of Dronpa in a spin-coated PVA film (8 x 10^{-7} M Dronpa in PBS containing 1 wt% PVA) excited at 488 nm (excitation power = 1.9 nW). (A) Areas (i) and (ii) are scanned with a 488 –nm laser at a power of 7.2 and 0.67 μW, respectively, before the entire area was imaged. Areas (i) and (ii) showed dim fluorescence, demonstrating efficient photoswitching from the B to the A_2 form. (B) Fluorescence image obtained by scanning the same area as shown in (A) after 16 hours of rest in the dark. The fluorescence intensity of the areas (i) and (ii) is slightly higher than that in image A, demonstrating that the rate of the dark-state recovery of the B form in PVA is comparable to that in PBS. This data suggests that the influence of the matrix on the dark-state recovery is negligible. (C) Parts of (i) and (ii) (indicated by black lines) were scanned with a 405-nm laser (5.5 nW) before the entire area was imaged with the 488-nm laser. The fluorescence signal from the area scanned with 405-nm light was almost completely recovered, demonstrating efficient photoswitching from the A_2 to the B form. This result also demonstrates that the disappearance of the fluorescence signal in the areas (i) and (ii) in the image A is not the result of photobleaching, but the result of pure photoswitching from the B to the A_2 form. Scale bar = 5 μm.