



**Fig. S2. Sample preparation of intact PBSs from *Anabaena sp.* strain PCC 7120.**

**(A)** Separation of PBSs using sucrose density gradient centrifugation methods. Band 1 indicates the sample of PBSs used for single particle analysis in this study. Band 2 and the two weak bands near it (indicated by asterisks) are also PBSs, but EM images showed aggregates of PBS particles in these bands.

**(B)** Fluorescence emission spectra of intact PBS from band 1 excited by 590nm at 77K. A main maximum at 687nm (terminal emitter) and two small peaks at 644nm (PC) and 660nm (APC) are shown.

**(C)** Absorption spectrum of PBS preparation.

**(D)** Fluorescence emission spectra of PBS (black), PC (blue) and APC (red) when excited by a 440 nm light.

**(E)** SDS-PAGE analysis of protein components in PBS from band 1. The bands of  $L_{CM}$ ,  $L_R$ ,  $L_{RC}$ ,  $L_C$ ,  $L_{RT}$ , PC, APC and FNR are indicated.

**(F)** Raw images of negatively stained PBS sample. Typical side, top, and oblique images are indicated with circles in black, white and blue, respectively.