Supplementary Material for Chemical Communications

Supplementary data

A simulation of key aspects of primary process in natural photosynthesis by a Langmuir-Blodgett film assembly

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Accumulation of radical species in the H+ASD/D' assembly

In the present study we observed the accumulation of the radical species in the H+ASD/D' assembly by the SSPM measurements. To support these results, it is beneficial to try the absorption measurements on the accumulation of radical species. However, the absorption changes induced by the accumulation of the radical species are too small to detect on the single bilayer. To achieve enough S/N ratios, the absorption measurements should be performed on LB multilayers prepared by more than 100 times deposition of the bilayer structure [1]. Unfortunately there is another difficulty in trying to deposit such multiple bilayers due to the stability of the deposited films during the dipping procedure. In order to investigate the absorption changes efforts are underway to reduce the difficulties. Alternately, we checked accumulation of viologen cation radical ($V^{\bullet+}$) with the time course of UV irradiation by the similar method reported in the previous study [1]. Figure 1 shows the decrease of fluorescence intensity with elapsed time of UV irradiation observed for the H+ASD/D' bilayer deposited on a quartz substrate. The decay of the pyrene fluorescence at 400 nm is probably due to the

energy transfer quenching by viologen cation radical accumulated in the film. It should be noted that the excited pyrene (H*) is strongly quenched by S moiety in the triad, so that the energy transfer from H* to $V^{\bullet+}$ is competing with the light harvesting process.

References

1. M. Sakomura and M. Fujihira, *Chem. Lett*., 1998, 701-702.

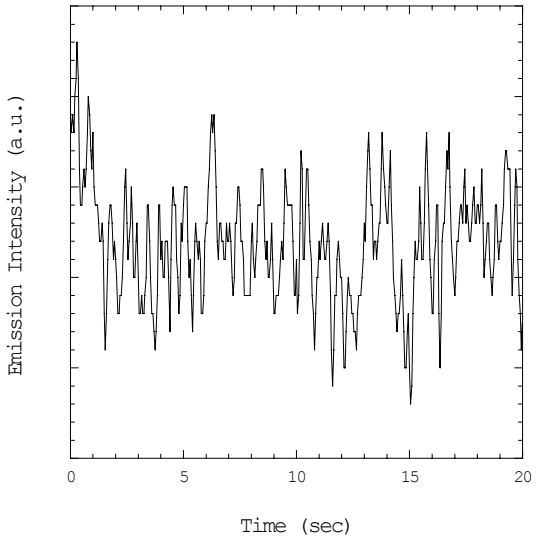
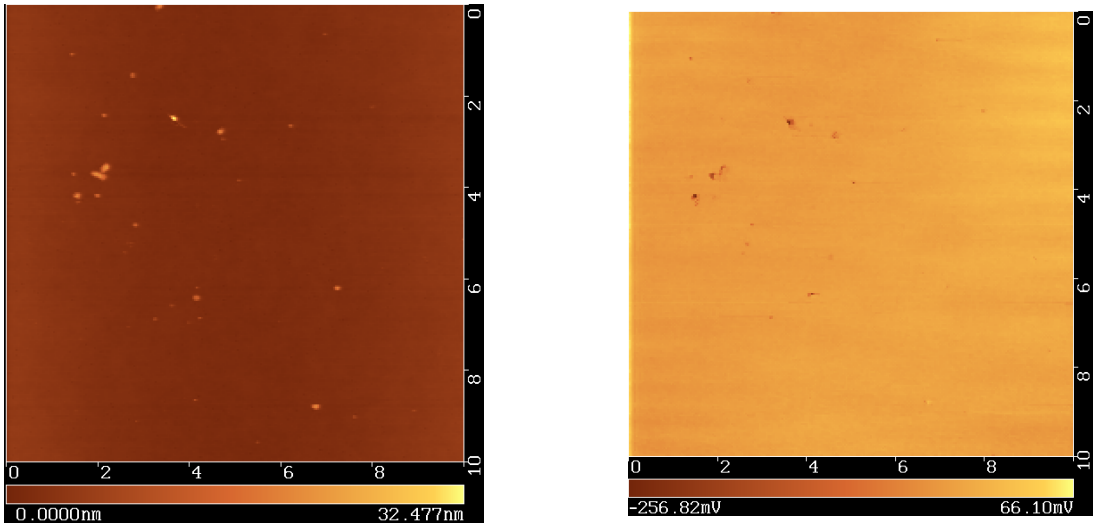


Fig. 1 The changes in the fluorescence intensity at 400 nm of the H+ASD/D' assembly under UV irradiation at 350 nm.

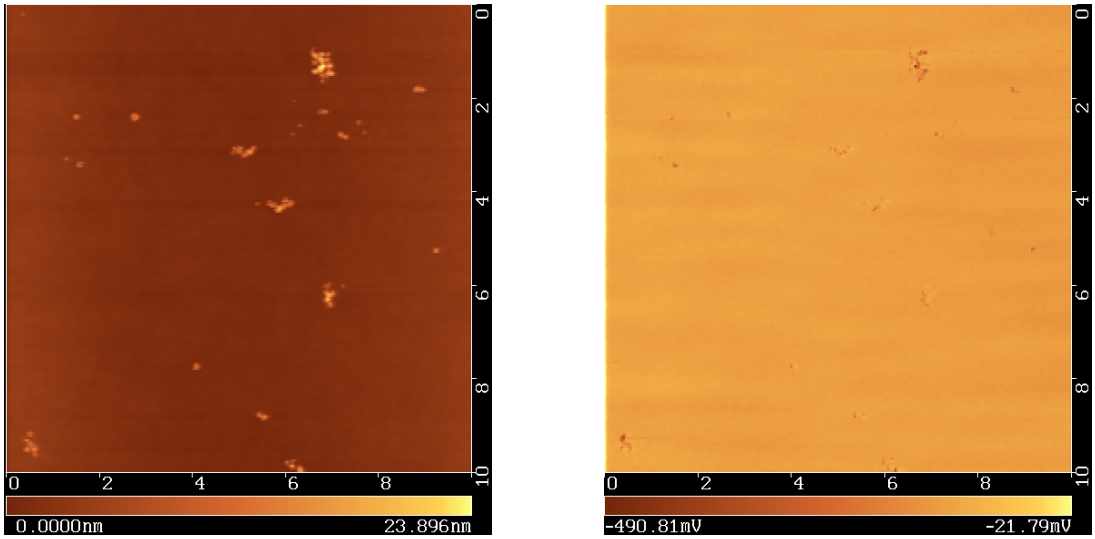
Atmic force and friction force microscopic images

The AFM and FFM images (scan area: 10 μm×10 μm) of a H+ASD monolayer and a pure H monolayer deposited on cover glasses at a constant surface pressure of 20 mNm^{-1} are shown in Figs. 2 and 3, respectively. The small grains similarly observed on both films increased as the surface pressure was increased. Those are probably microcrystallines of H. These results suggest that the addition of ASD to H did not cause inhomogeneities such as phase separations. The uniformity of the mixed monolayer of ASD and H is likely to assure that the lateral distances between ASD molecules can be controlled by the dilution with H.



(a) (b)

Fig. 2 AFM (a) and FFM (b) images of H+ASD LB monolayer deposited on a cover glass substrate.



(a) (b)

Fig. 3 AFM (a) and FFM (b) images of pure H LB monolayer deposited on a cover glass substrate.