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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Photochemical aging of atmospherically reactive organic compounds involving brown carbon at the air-aqueous interface" *by* Siyang Li et al.

Anonymous Referee #1

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The work of Li et al. presents a detailed investigation of photochemical aging of atmospheric relevant organic films at the air-aqueous interface. The stability and oxidized products of organic film under UV irradiation were studied with the aid of Langmuir trough and Infrared reflection absorption spectroscopy (IRRAS). This work represents a significant advance, as the water soluble organic compounds extracted from atmospheric and chamber samples were used in the Langmuir experiments for the first time. These methods play an actual role in researching the photochemical aging of organic-coated aqueous aerosols, and the further atmospheric implications. The area expansion of DOPC film was revealed by relaxation curves and was further confirmed by IRRAS spectra. The authors illustrated the mechanisms for the photosensitizing

reaction of organic film consisted by unsaturated lipid and brown carbon. The authors have established a representative model for organic aerosol coating with advanced instruments. The methods are appropriate and properly conducted, and the experimental data presented in this work is of high quality. The manuscript is well written, although the authors need to make some small modifications (see details below). This manuscript can be published in Atmospheric Chemistry and Physics after revisions in consideration of the following comments:

Page 4: Why did the authors mix photosensitizers with the artificial seawater? The effect of artificial seawater in the experiment should be described.

Page 5, line 1: The chamber experiment needs to be more specific on the drying conditions.

Page 7, line 14: The surface state of DOPC monolayers underwent a transition from the gas phase to the liquid phase. The authors should describe gas and liquid phase of monolayer.

Page 12: The y-axes in Figure 5 that are being directly compared had different ranges. It might make more sense to compare A and C in the same ranges (so, switch the y-axes for subplots C and D).

Page 16: Organic coatings on the aerosols are also important for multiphase chemistry in the atmosphere (i.e. N_2O_5, HNO_3 uptake). A more expansive discussion of the effect of organic film on the multiphase aerosol chemistry in the atmospheric implication section is encouraged.

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