Supporting Information

Novel Photochromic System Using Methylene Blue Reduction with Ascorbic Acid

Takahiro Suzuki,*[a] Fuka Nakamura,[b] Kanon Ie,[c] Masaaki Fujii [d] and Masayuki Inoue [a]

a. Department of Chemistry, Faculty of Science, Tokyo University of Science, 1-3 Kagurazaka, Shinjyuku-ku, Tokyo 162-8601, Japan. E-mail: staka@rs.tus.ac.jp

b. Otsuma Ranzan Junior and Senior High School, 558 Sugaya, Ranzan-machi, Hiki-gun, Saitama 355-0221, Japan

c. Mathematics and Science Education, Graduate School of Science, Tokyo University of Science, 1-3 Kagurazaka, Shinjyuku-ku, Tokyo 162-8601, Japan.

d. Research and Development Initiative, Chuo University, 1-13-27 Kasuga, Bunkyo-ku, Tokyo 112-8551, Japan

S1. Effect of Light Intensity on Color

A 600-lux blue-violet LED light was used in this experiment. A lower maximum absorbance was recorded when the intensity of the light was reduced by a factor of ten (i.e., to 60 lux).

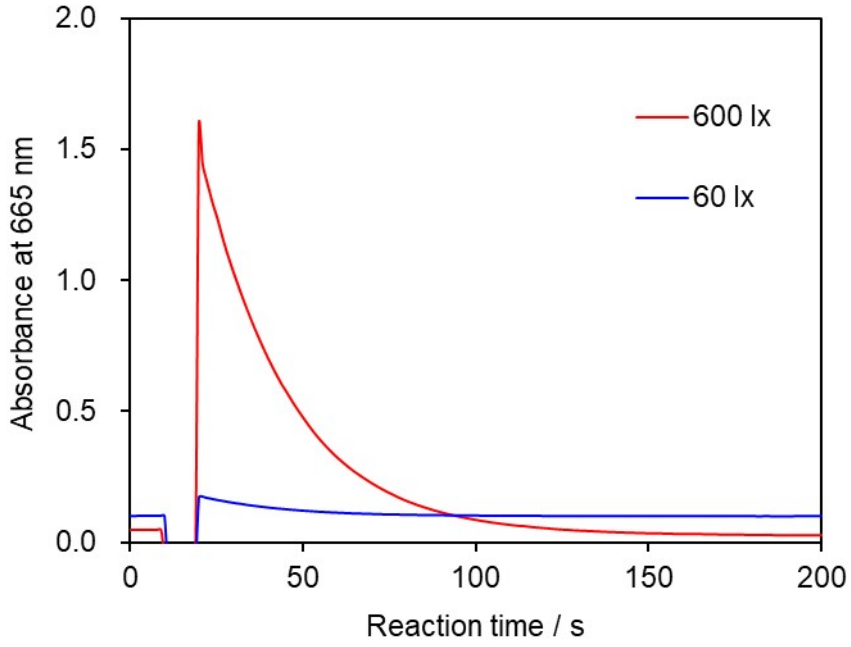

Fig. S1 Time-dependent changes in absorbance when the reaction solution was irradiated at different illuminances**.**

S2. Sensitivity of the Reaction Solution to Ambient Light (Light from a Fluorescent and a White LED Lamp)

Absorbances were measured when the reaction solution was exposed to light from a fluorescent lamp and a white LED lamp at a distance of 5 cm from the liquid surface. No solution coloring was observed.

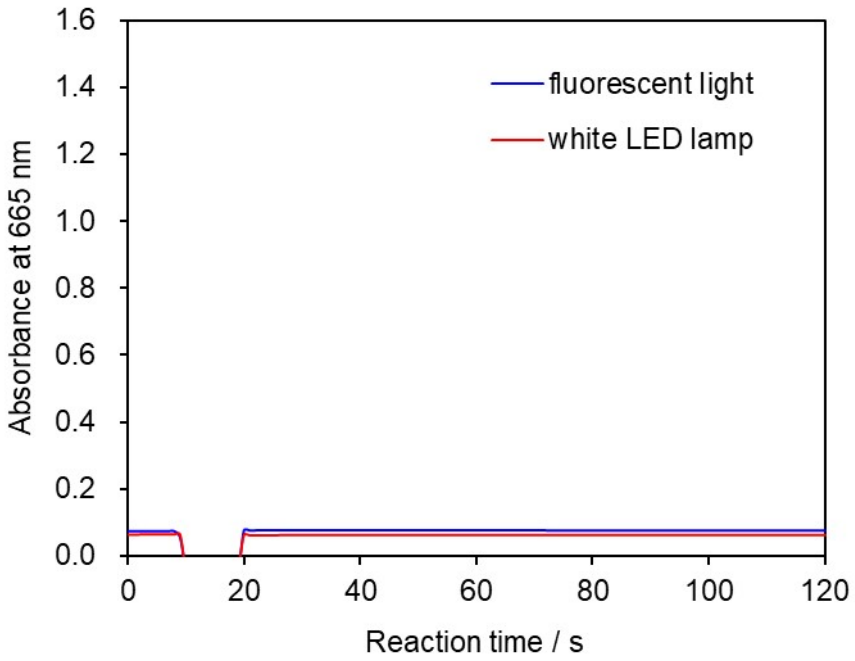

Fig. S2 Time-dependent changes in absorbance when exposed to fluorescent light and white light from an LED lamp.

S3. Reaction of solutions in blue bottle experiment with oxygen and blue-violet light

□

The solution for the blue bottle experiment was prepared by mixing 5.0 g of sodium hydroxide, 5.0 g of glucose, and 0.01 g of methylene blue in 250 mL of water according to Campbell's method, which was reported in 1963. The solution was colorless in a static state. When the solution was shaken or exposed to air or oxygen, the leucomethylene blue became oxidized, resulting in a blue color. However, irradiation with blue-violet light (405 nm) or ultraviolet light (365 nm) in the leucomethylene blue state did not color the solution.

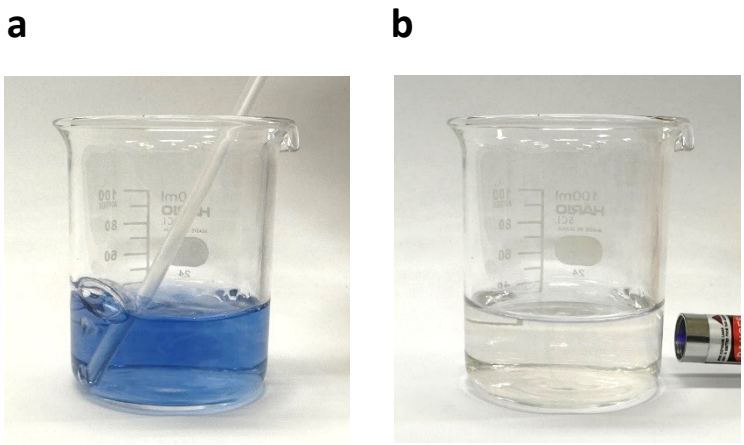

Fig. S3□Solution change in the blue bottle experiment. (a) Oxygen injection and (b) irradiation with blue-violet light (405 nm).