Supporting Information

A. SEM images

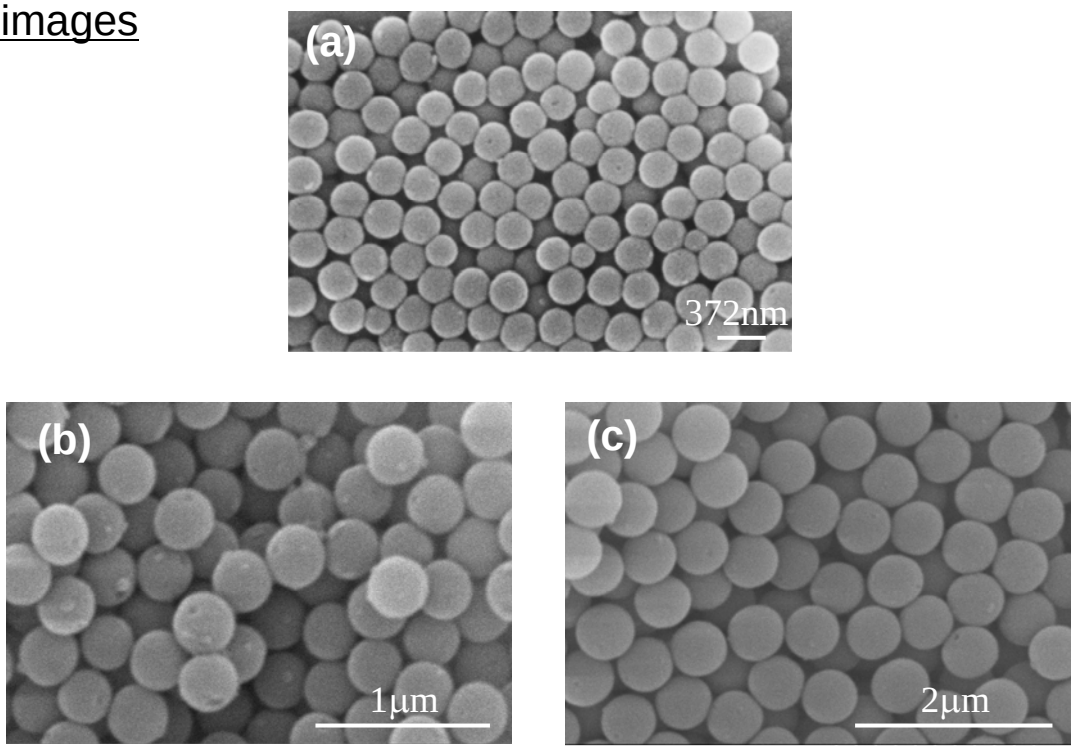

Figure S1. SEM images of prepared MMSS with diameters of (a) 265 nm, (b) 320 nm, and (c) 564 nm.

B. Nitrogen adsorption properties

To ensure that Alq_3 was adsorbed into the mesopores of MMSS, we conducted nitrogen adsorption measurement using MMSS templated by octyltrimethylammonium chloride (Tokyo Kasei).
Note that MMSS using in nitrogen adsorption measurement exhibits the pore diameter of 25 Å which is a little larger than that of MMSS described in the text.
The detailed synthetic condition was shown in elsewhere.[1]

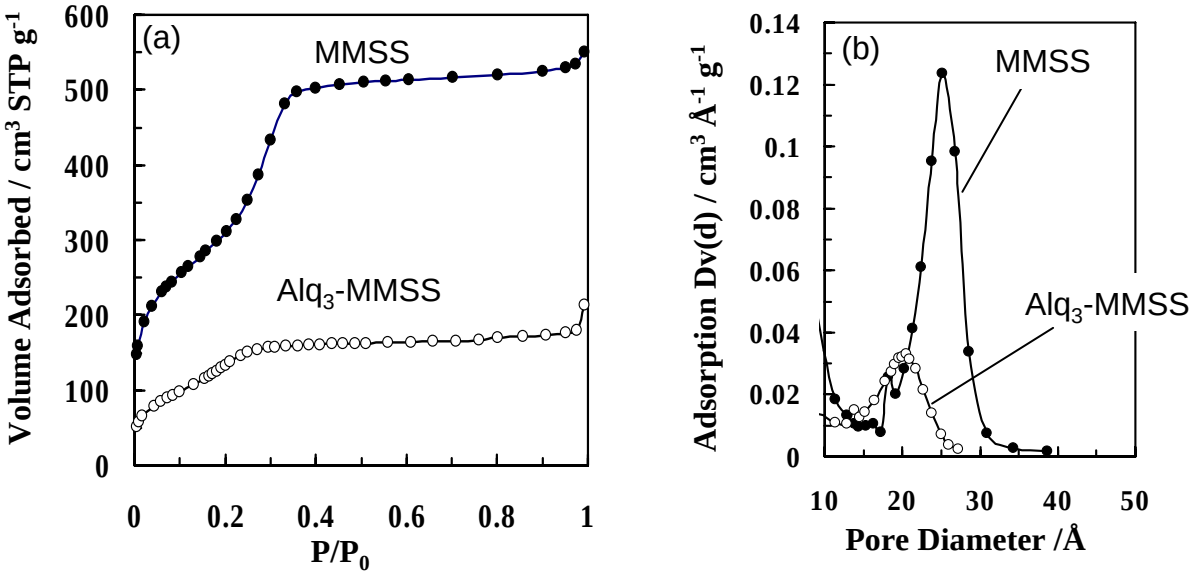

Figure S2. (a) N_2 adsorption isotherms and (b) corresponding pore size distribution curves for MMSS and Alq_3-MMSS conjugate.

Reference

(S1) Yano, K.; Fukushima, Y. *J. Mater. Chem*. **2004**, 14, 1579.

C. Fluorescence spectra

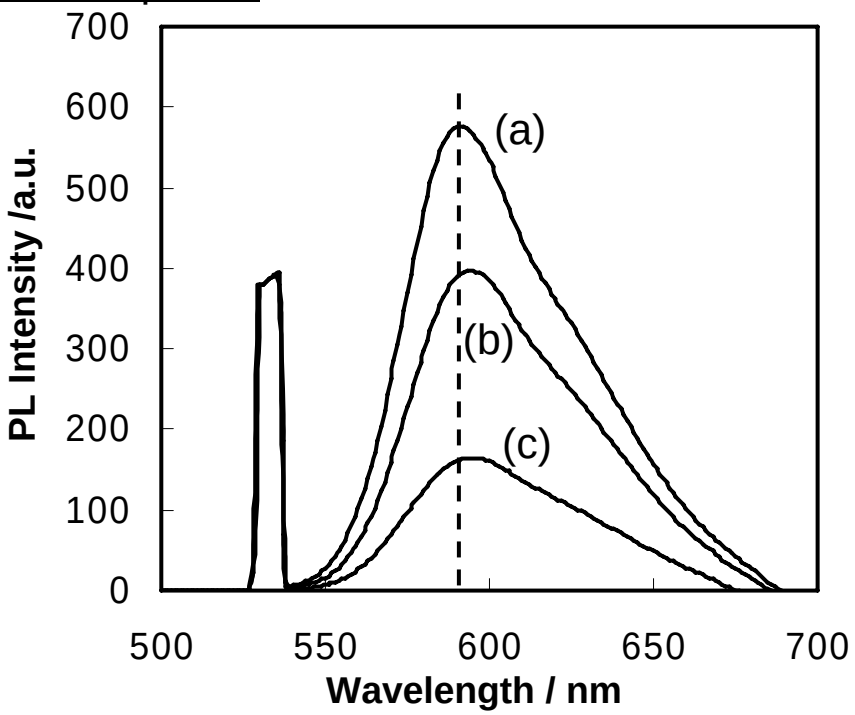

Figure S3. Fluorescence spectra of Rh B-MMSS conjugates excited with 532nm light from a Xe lamp. Concentration of Rh B: (a) 0.2, (b) 0.42, (c) 0.84 mg/100 mg-MMSS. The dashed line represents the peak wavelength of (a) and serves as a guide to the eye.

D. Digital photo images

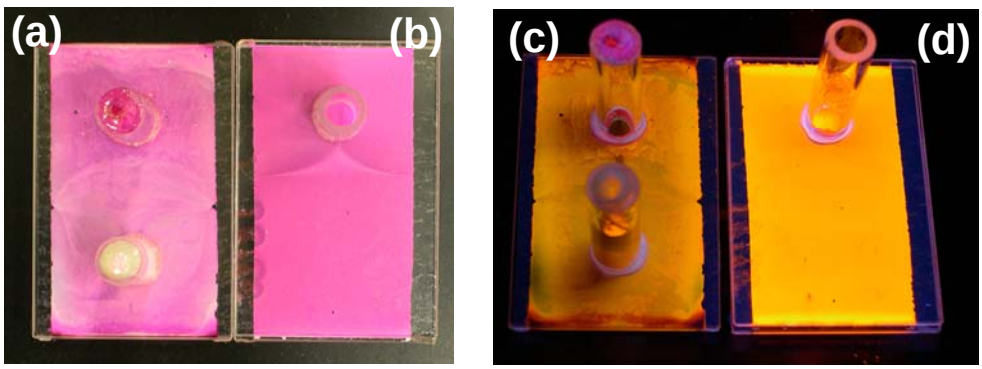

Figure S4. Photo images taken under natural light (a, b) and UV light (c, d) for the silica colloidal crystal which infiltrated Rhodamine B after the fabrication of the crystal (a, c) and Rhodamine B-MMSS synthetic opal (b, d). As can be observed, the synthetic opal from Rhodamine B-MMSS is very homogeneous.

E. Angle-resolved emission spectra of sample 2

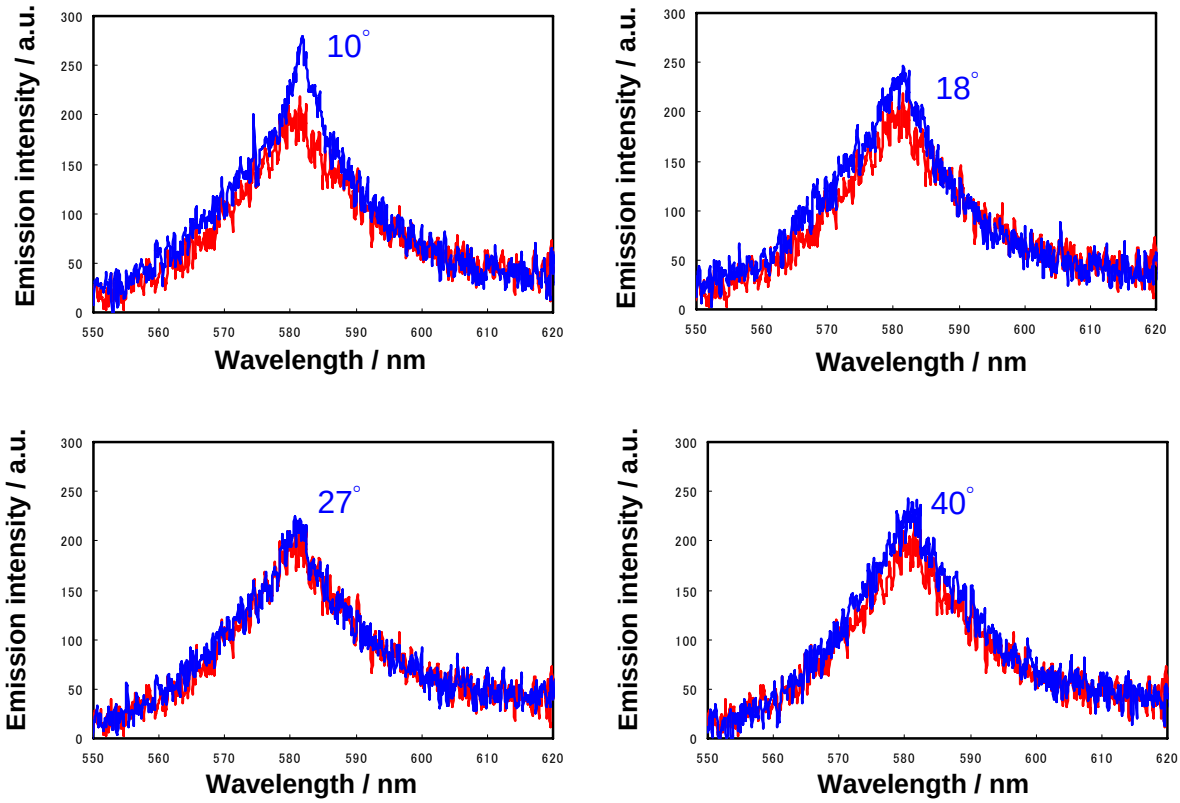

Figure S5. Angle-resolved emission spectra of sample 2 at the detection angles of 10°, 18°, 27°, and 40° (blue). The detection angles are indicated in the graphs. To follow the change in the peak intensity easier, the emission profile at the angle of 29° (red) where the peak intensity is a minimum is shown also.

F. Emission study for another MMSS synthetic opal impregnated with Rhodamine B.

To ensure the reproducibility for the amplified spontaneous emission by taking advantage of the stop band, another synthetic opal from MMSS was prepared.
MMSS with diameter of 370nm was used to form Rhodamine B- MMSS conjugate. The adsorption of Rhodamine B was conducted in ethanol solution (1.25mM), which results in the amount of adsorbed dye with 0.2mg/100mg of MMSS. The fabrication of the synthetic opal from above conjugate is the same manner as was written in the text.

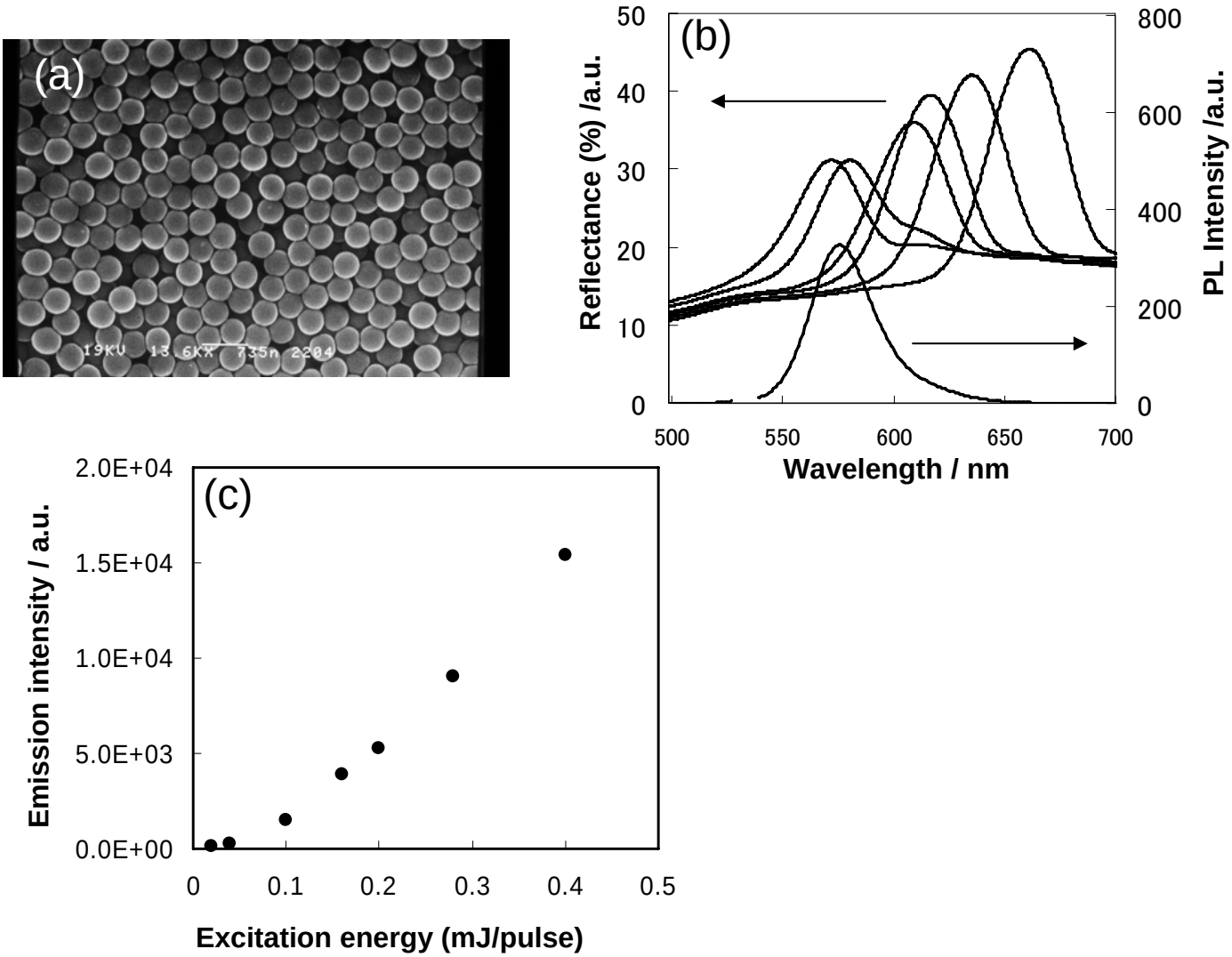

Figure S6. (a) SEM image of MMSS with diameters of 370 nm. (b) Fluorescence spectrum and angle-resolved reflection spectra. Reflection spectra at angles of incidence of (from right to left) 26º, 32º , 36º, 38º , 42º, and 44º. (c) Changes in the emission peak intensity as a function of excitation pulse energy.

G. Emission spectrum with a laser spot size of 100 μm

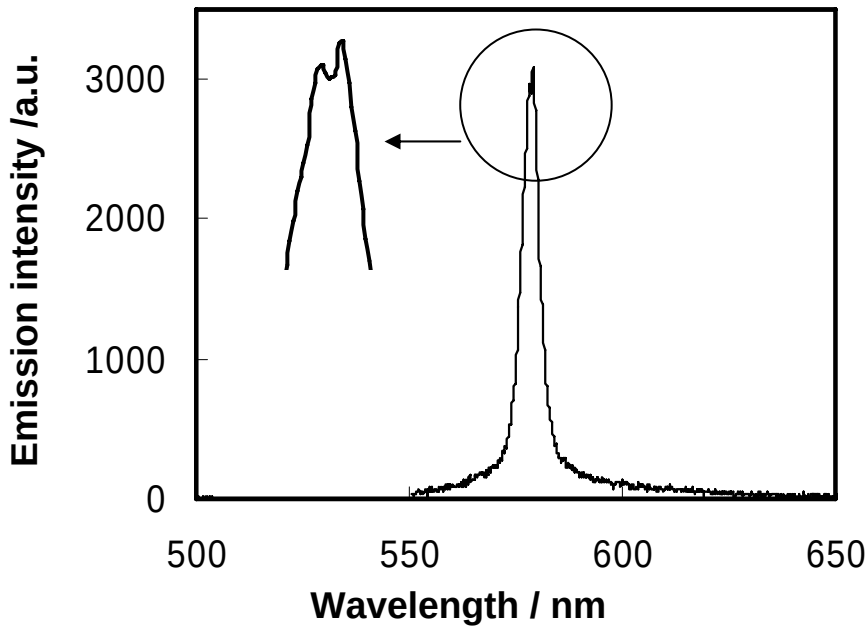

Figure S7. An emission spectrum from sample 2 with an excitation energy of 0.029 mJ/pulse and a laser spot size of 100 μ m.