Electronic Supplementary Material (ESI) for New Journal of Chemistry. This journal is © The Royal Society of Chemistry and the Centre National de la Recherche Scientifique 2018

New Journal of Chemistry

Supporting Information for

High internal phase water/oil and oil/water gel emulsions formed using a glucose-based low-molecular-weight gelator

Fumiyasu Ono*,a Seiji Shinkai^b and Hisayuki Watanabea,c

1. Materials

The glucose-based gelator **1** was prepared as described previously.^{S1} Silicone oil (decamethylcyclopentasiloxane, KF995) was purchased from Shin-Etsu Chemical Co., Ltd. Uranine and Tween 20 were purchased from Wako Pure Chemical Industries.

2. Preparation of high internal phase gel emulsions

2.1. Gel emulsion of silicone oil and water prepared using LMWG 1

Gelator 1 (5.0 mg), silicone oil (0.3 mL), and water (1.7 mL) were mixed in a seal-cap vial and heated in a dry bath until the solid dissolved. The vial was vortexed for 3 min and cooled to room temperature.

2.2. Gel emulsion of silicone oil and water prepared from LMWG 1 and Tween 20

Gelator 1 (5.0 mg), Tween 20 (40.0 mg), silicone oil (1.7 mL), and water (0.3 mL) were mixed in a sealcap vial and heated in a dry bath until the solid dissolved. The vial was vortexed for 3 min and cooled to room temperature.

3. Confocal laser scanning microscopy

High internal phase gel emulsions composed of silicone oil and 5 µM aqueous uranine were prepared as described above, placed in a glass-bottomed dish (Matsunami Glass Inc., Ltd.), and imaged using a confocal laser scanning microscope (LSM700, Carl Zeiss Microscopy Co., Ltd.).

4. Rheological measurements

Rheological measurements were conducted using an Anton Parr MCR 301 rheometer (Anton Paar Japan K. K). For silicone oil and the hydrogel, LMWG **1** and the required solvent were mixed in a seal-cap vial and heated in a dry bath until the solid dissolved. The solution was poured onto the sample stage and allowed to settle for 15 min at 25 °C. Subsequent rheological measurements were performed as described elsewhere.^{S1} For the gel emulsion of LMWG **1**, silicone oil and water were mixed in a seal-cap vial and heated in a dry bath until the solid dissolved. The vial was vortexed for 3 min and cooled to room temperature, and the gel emulsion obtained in this manner was poured onto the sample stage. Measurements were performed at 25 °C using a 50-mm-diameter cone-type plate at a tilt angle of 1.0°, in either strain-sweep (0.01–100%) mode at a constant angular frequency of 6.28 rad s⁻¹, or in frequency-sweep (0.0628–628.0 rad s⁻¹) mode at a constant strain of 0.1%.

New Journal of Chemistry



Fig. S1. Rheological analyses of (a) silicone oil gel and (b) hydrogel prepared using LMWG 1. S1

5. XRD measurements

For the silicone oil and the hydrogel, LMWG 1 and the desired solvent were mixed in a seal-cap vial and heated in a dry bath until the solid dissolved. The vial was stored at room temperature for 1 h, vortexed for 3 min, and stored for a further 1 h at room temperature. The gels obtained in this manner were freezedried for 1 d. For the gel emulsion, LMWG 1, silicone oil, and water were mixed in a seal-cap vial and heated in a dry bath until the solid dissolved. The vial was vortexed for 3 min, cooled to room temperature, and the resulting gel was freeze-dried for 1 d. Powder XRD patterns of the above xerogels were measured on a Rigaku RINT-TTR III X-ray diffractometer equipped with a Cu K_{α} radiation source (50 kV, 300 mA) at a scan rate of 1° min⁻¹.

6. SEM observation

SEM imaging was performed on an FEI Inspect S50 instrument operated at an accelerating voltage of 10 kV, at the Analytical Center in Fukuoka industry-academia Symphonicity. The xerogel of gel-emulsion was obtained by freezing in liquid N_2 and was connected to a freeze dryer (EYELA FDU-2110) for 3 days. The obtained xerogel was then coated with platinum.

Reference

S1. F. Ono, O. Hirata, K. Ichimaru, K. Saruhashi, H. Watanabe and S. Shinkai, *Eur. J. Org. Chem.*, 2015, 2015, 6439.