7/6/11
Surfactant:Oil:Water (55:31:14)

Surfactant

7:1 mixture of Hitenol BC-05:Noigen RN-10

7/6/11: In 50 mL tube; 30.3 g Hitenol, 4.3 g Noigen

Oil

Butyl methacrylate (in refrigerator; use in hood only)

Water

H2O + gold precursor

7/6/11: We made a stock solution of 1.77:1 of surfactant:oil (17.240 g surfactant : 9.74 g oil). Density of mixture: 0.83 mg/uL. When we added 830.0 mg of surfactant/oil mixture to 135 uL mg H2O, we did not obtain desired results. Substance did not form gel as expected, therefore we measured each component (surfactant/oil/water) separately.

1) In vial with screw cap, weigh 502.5 mg surfactant. Heat on 70°C hot plate

2) Add 283.2 mg oil (in hood). Heat on 70°C hot plate. Vortex to mix with surfactant

3) Add 127.8 mg H2O. Heat on hot plate and vortex to mix

7/6/11: Yellow gel forms

Next step: vary concentrations of gold salt in H2O: 4 mM, 40 mM, 400 mM. Followed previous steps with different amounts

4 mM

1) 530.2 mg surfactant

2) 298.8 mg oil (actual: 301 mg)

3) 134.96 mg 4 mM HAuCl4 (actual: 137 mg)

40 mM

1) 530.1 mg surfactant

2) 298.8 mg oil (actual: 300 mg)

3) 134.9 mg 40 mM HAuCl4 (actual: 136 mg)

400 mM

1) 564.5 mg surfactant

2) 318.2 mg oil (actual: 317 mg)
3) 143.7 mg 400 mM HAuCl4 (actual: 154 mg)

7/7/11: Mixtures not solidified.
Practiced making mesophases with just water (no gold salt). First few mesophases were unsolidified. Previous mesophases had been made successfully, so reagents assumed not to be the problem. We suspected the unsolidification was due to undermixing. To test this, we heated the surfactant/oil/water mixture for a longer time (~8 min) and a higher temperature (80 °C), then vortexed thoroughly. After these steps, gels formed almost immediately.

7/8/11: Previous mesophase mixtures (4 mM, 40 mM, 400 mM) that did not solidify were heated to ~80 °C until contents flowed freely (~8 minutes), then vortexed. Gels formed for 4 mM sample and 40 mM sample, but 400 mM sample remained unsolidified (excess of 400 mM HAuCl4 added when being made).

7/12/11: Made new 4 mM, 40 mM, and 400 mM mesophases. All solidified into gels. Visualized gels using UV-VIS.

Using UV-VIS
Open: Cary Win UV -> Scanning Kinetics
a) Zero system (make sure not to place sample in slot yet)
b) Setup:
Start: 900 nm, Stop: 400 nm
Mode Abs min: -0.1, max: 2.00
Ave. time: 0.200
Option tab-- Auto lamp off (to preserve lamp life)
Cycle (min): 5 min, Stop (min): 5 min (conducts 2 scans)
Accessories tab-- check the following boxes: Use cell changer, auto temp setting
Measured absorbance of 4 vials: 4 mM, 40 mM, 400 mM, and water (control). Each vial requires a blank vial in the corresponding position in the second set of slots. Peaks expected at 5xx (nanorod end) and 9xx (nanorod length).