Electronic Supplementary Information

Self-organization of multiple components in a steroidal hydrogel matrix: Design, construction and studies on novel tunable luminescent gels and xerogels

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Experimental section

Materials

All the materials were of commercial grade and purchased from Aldrich (except sodium cholate which was obtained from SRL) and used without further purification (pyrene was chromatographed prior to use).

Gelation Procedure

A typical procedure for making Eu-cholate (5 mM/15 mM) gel is described below. Other Ln-cholate gels were made in a similar way.

At room temperature (~25 °C), 200 μL of a solution of $Eu(OAc)_3$ (10 mM) was taken in a test tube (internal diameter: 0.8 cm, length: 7.5 cm). Then 200 μL of a solution of sodium cholate (30 mM) was added to it quickly. A white precipitate appeared instantaneously and the mixture turned turbid. On sonication this turbid solution turned into a translucent gel.

Spectroscopy

Absorption spectra were recorded on a Perkin-Elmer Lambda 35 spectrophotometer. Fluorescence spectra were recorded on a Varian Cary Eclipse (wet gels) and Perkin Elmer LS-50B (solid state) spectrophotometers, respectively in the phosphorescence mode (delay time 0.2 ms, gate time 3.0 ms, total decay time 20 ms). All the emission measurements for the hydrogels were done in a 2 mm square quartz cuvette whereas a 1 cm path-length quartz cuvette was used for the absorption spectral measurements. For the solid state phosphorescence, a front face accessory (1.6 cm diameter) was used. All the measurements were done at 25°C.

Transmission electron microscopy

Transmission electron micrographs of the xerogels were obtained using a TECNAI T-20 electron microscope operating at 200 kV. Thin films of the gels were made on the surface of carbon coated copper grids by dipping the grids inside the gel. The grids were subsequently dried in air for 3-4 hours. Then they were stained with 0.1 % aqueous uranyl acetate solution and desiccated for 5-6 hours under high vacuum before recording the TEM images.

Rheology

Dynamic rheological measurements were done on the gels on an AR 1000 rheometer (TA instruments) using a plate-plate geometry A serrated (only the rotor was serrated) plate-plate geometry (diameter 20 mm) was used in all the measurements. The temperature of the plate was controlled at 25 °C (± 0.1°C). The gels were made in test tubes by sonicating a mixture of the lanthanide acetate and sodium cholate for ~10 sec and subsequently transferred to the rheometer plate by using a micropipette. The geometry gap of 400 μm was set and the gels were stabilized in the geometry gap for 1 h. The solvent evaporation was kept minimized by placing a metallic cover as a solvent trap.

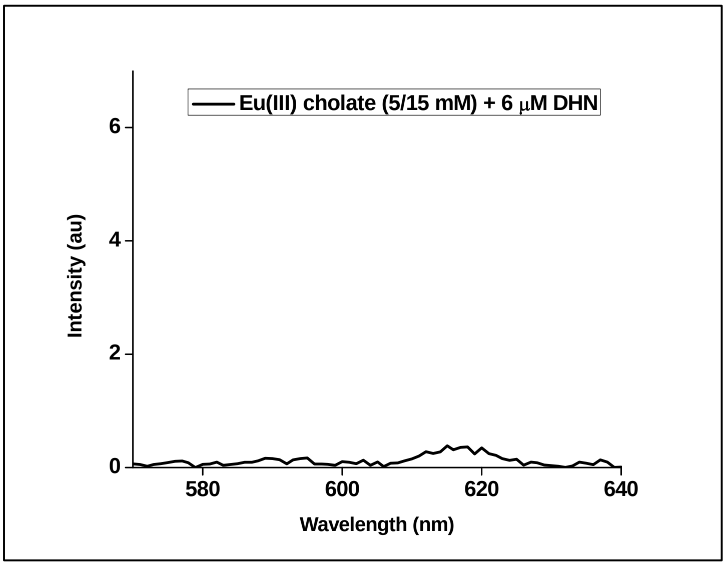

Fig. S1 Time delayed emission spectra of Eu(III) cholate (5/15 mM) doped with 6 μM DHN; delay time 0.2 ms, gate time 3.0 ms.

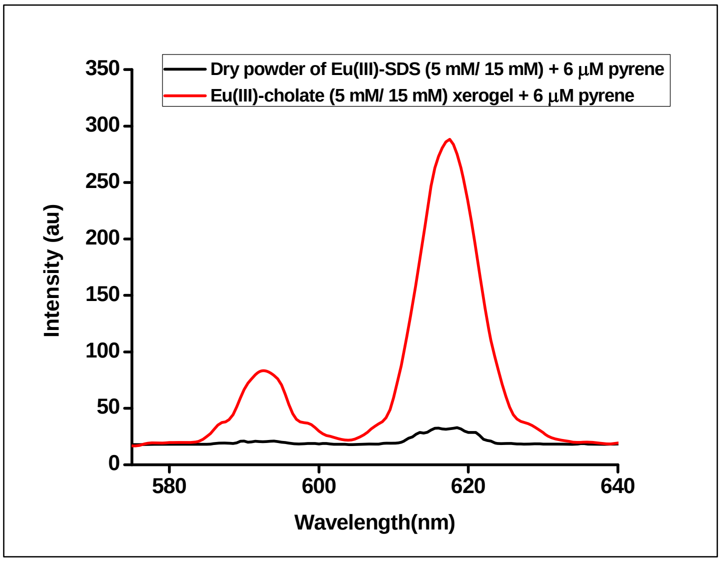

Figure S2. Time delayed emission spectra of Eu(III) cholate (5/15 mM) xerogel and dry powder of Eu(III)-SDS (5/15 mM), both doped with 6 μM pyrene; delay time 0.2 ms, gate time 3.0. ms.

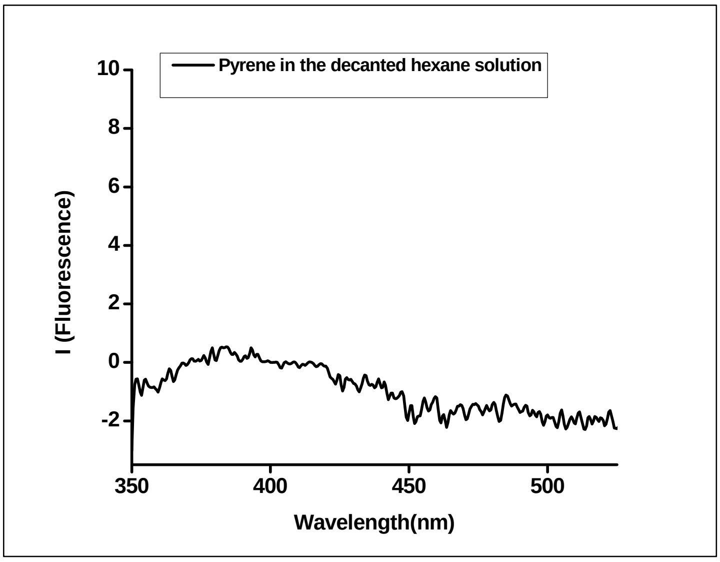

Figure S3. Fluorescence spectra of pyrene in the solution decanted from the suspension of Eu(III)-cholate in *n*-hexane.