### **Supporting information**

## A Novel Picric Acid Film Sensor via Combination of the Surface Enrichment Effect of Chitosan Films and the Aggregation-Induced Emission Effect of Siloles

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# 1. Images of the HPS nano-particles prepared in THF-water mixture solvents with different compositions

The HPS nano-particles were prepared in THF-water mixture solvents with different compositions. It is to be noted, however, that the stability of the mixtures (suspensions indeed!) also depends upon, but not linearly, the ratios of the mixture solvents. When the fraction of water in the mixture is less than 50% (v:v), the systems are transparent and stable, but they are non-fluorescent. With increasing the fraction to a range of 60 to 70% (v:v), and to another range of more than 99% (v:v), the system is phase separated. However, for the systems with water contents from 80% to 96% (v:v), the suspensions are stable, and fluorescence active (c.f. Figure S1). These systems can be used for the preparation of the hybrid films.



Figure S1. Images of HPS nano-particles prepared in different water fraction.

#### 2. Determination of the detection limit of the hybrid film to picric acid

Detection limit of the present film was determined according to the following definitions:

$$s_{b} = \sqrt{\frac{\sum_{i=1}^{n} (x_{i} - \overline{x})^{2}}{n - 1}}$$
(1)

$$S = \frac{\Delta I}{\Delta c} \tag{2}$$

$$DL = \frac{3s_b}{S} \tag{3}$$

Firstly, the standard deviation  $(s_b)$  was calculated by measuring the fluorescence intensity of the hybrid film in pure water for more than 10 times and then got the average intensity  $(\bar{x})$ . By fitting the data into equation 1, the value of standard deviation  $(s_b)$  was obtained. Secondly, a certain amount of picric acid was added into the solvent and the resulting variation of the intensity  $(\Delta I)$  was recorded. By fitting the data into equation 2, where  $\Delta I$  is the variation of intensity, and  $\Delta c$  is the variation of quencher concentration, the value of precision *S* was calculated. Finally the detection limit, DL, was calculated according to Function 3.