Electronic Supplementary Information (ESI)

Aggregation-induced emission-active gold(I) complexes with multi-stimuli luminescence switching

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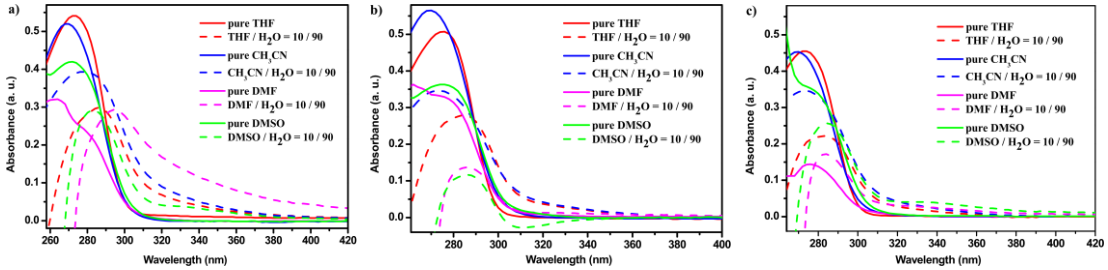

Fig. S1 UV spectras of luminogens **1** in different solvents-water mixture solutions with f_w = 0 and 90%. Solution concentration: 10 μM.

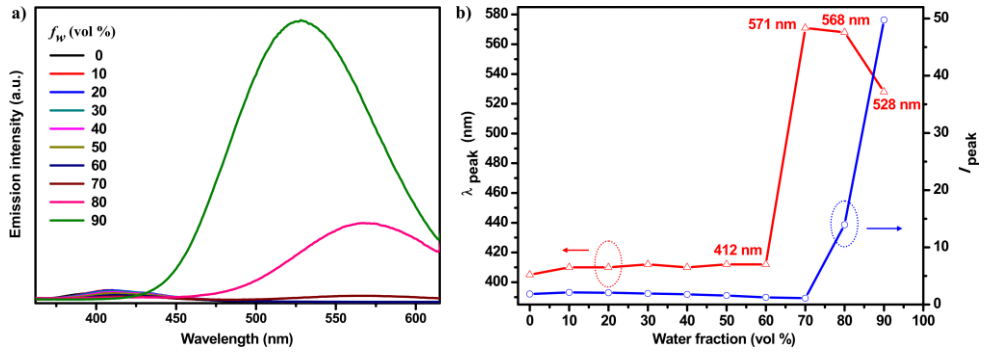

Fig. S2 a) Emission spectra of luminogen **1a** in the THF/water mixtures. b) Plots of maximum emission wavelength (λ) and intensity (I) of **1a** versus water fraction in the aqueous mixture. Solution concentration: 10 μM. Excitation wavelength: 315 nm.

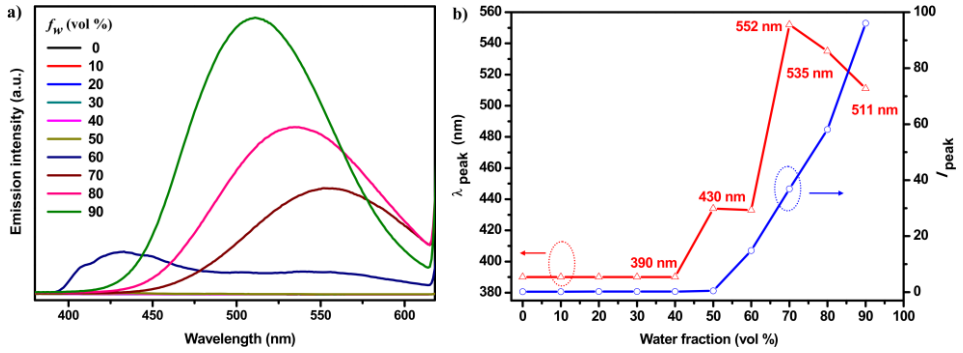

Fig. S3 a) Emission spectra of luminogen **1a** in the acetonitrile/water mixtures. b) Plots of maximum emission wavelength (λ) and intensity (I) of **1a** versus water fraction in the aqueous mixture. Solution concentration: 10 μM. Excitation wavelength: 315 nm.

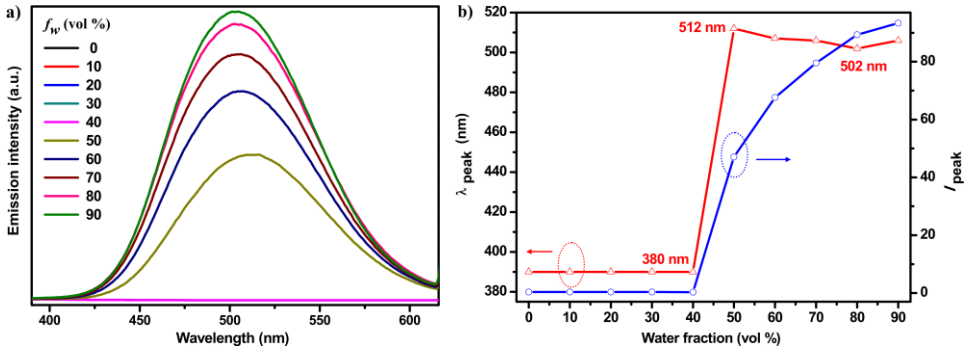

Fig. S4 a) Emission spectra of luminogen **1a** in the DMF/water mixtures. b) Plots of maximum emission wavelength (λ) and intensity (I) of **1a** versus water fraction in the aqueous mixture. Solution concentration: 10 μM. Excitation wavelength: 315 nm.

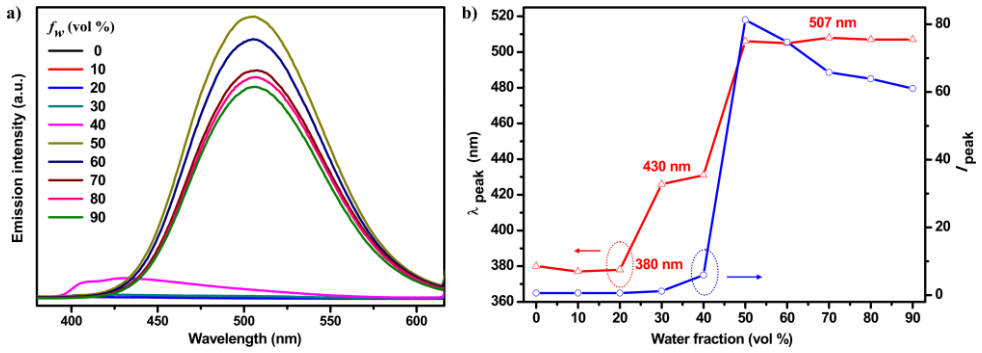

Fig. S5 a) Emission spectra of luminogen **1a** in the DMSO/water mixtures. b) Plots of maximum emission wavelength (λ) and intensity (I) of **1a** versus water fraction in the aqueous mixture. Solution concentration: 10 μM. Excitation wavelength: 315 nm.

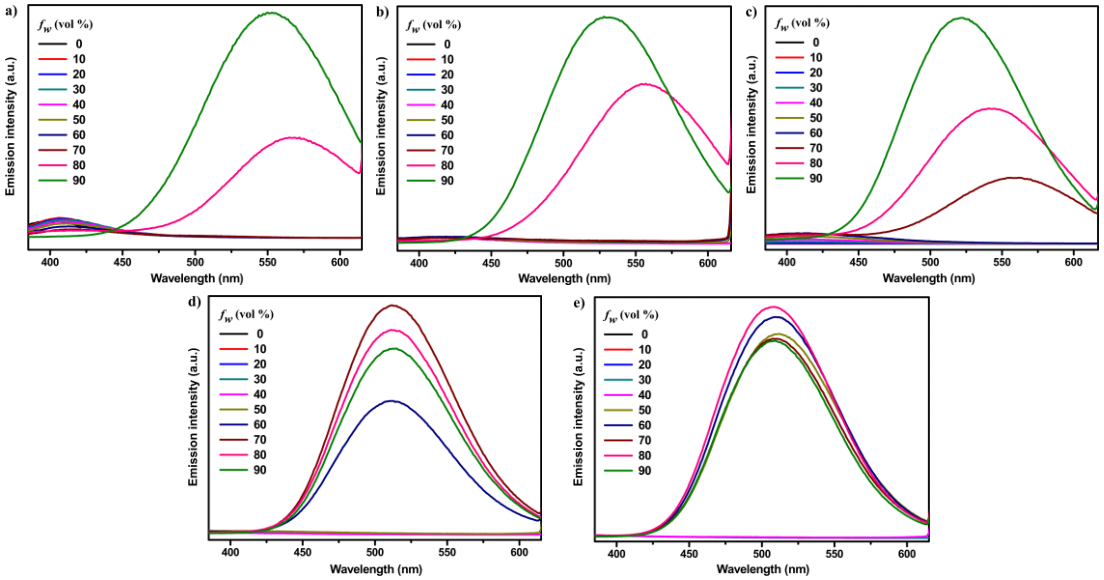

Fig. S6 Emission spectra of luminogen **1b** in different solvents-water mixture. a) THF, b) acetonitrile, c) acetone, d) DMF, e) DMSO.

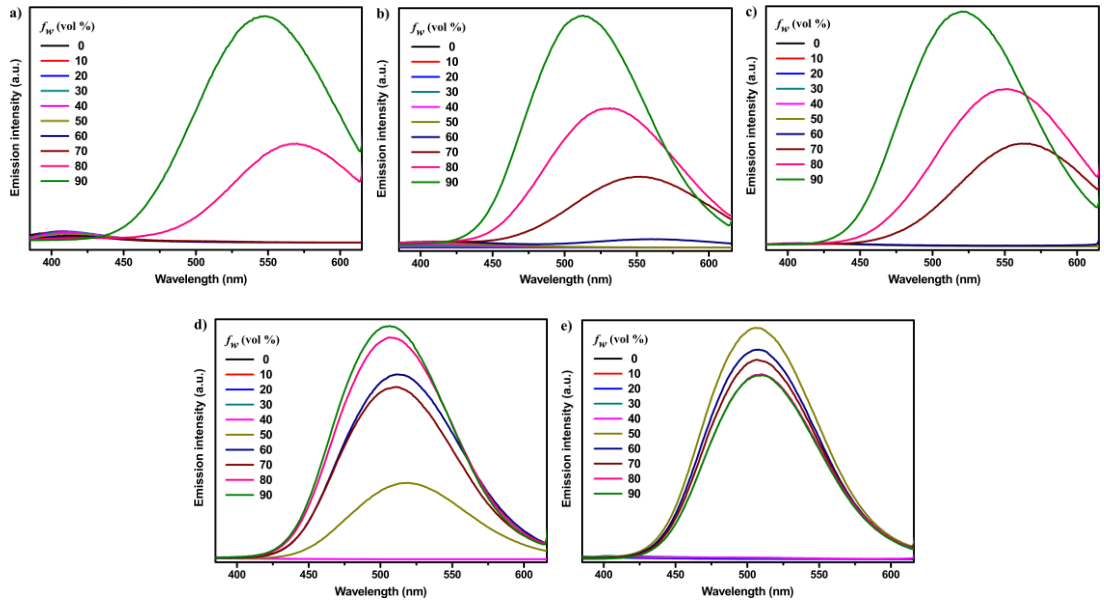

Fig. S7 Emission spectra of luminogen **1c** in different solvents-water mixture. a) THF, b) acetonitrile, c) acetone, d) DMF, e) DMSO.

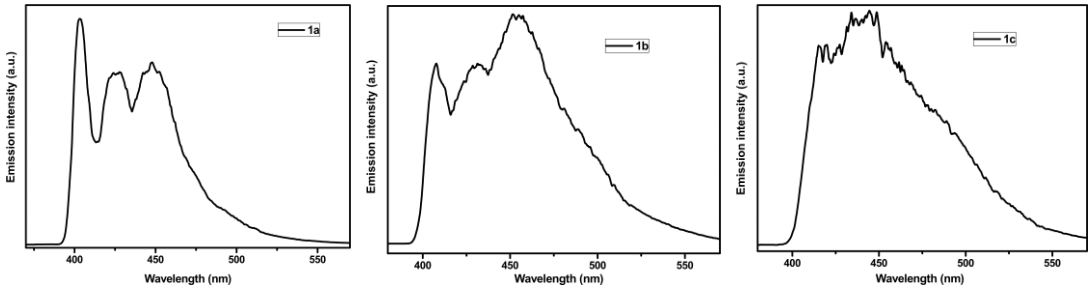

Fig. S8 Emission spectra of luminogen **1** in the 2-methyl tetrahydrofuran at low temperatures (77K). (Excitation wavelength: 315 nm)

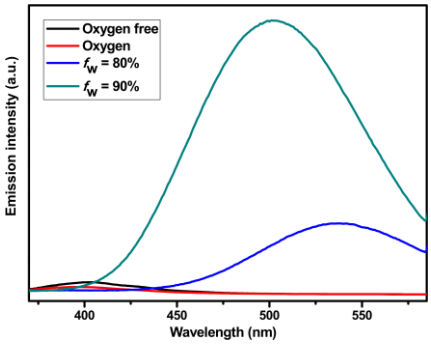

Fig. S9 Emission spectra of luminogen **1a** in the THF under different conditions. (Excitation wavelength: 315 nm).

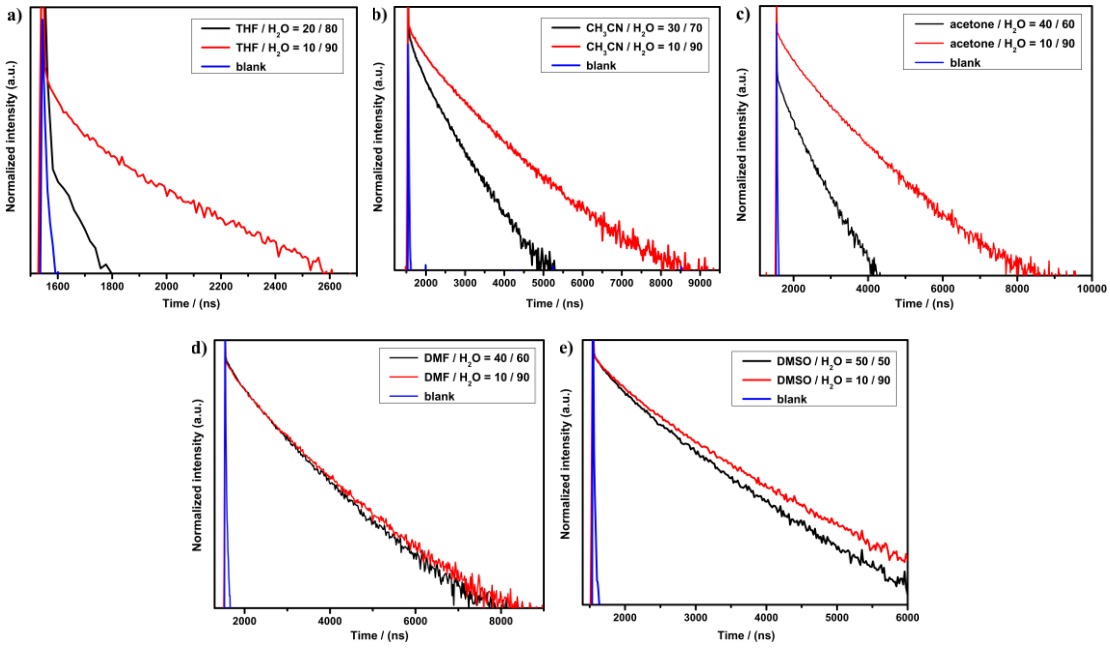

Fig. S10 Time-resolved luminescence of luminogen **1a** in different solvents-water mixture with different fractions of water (fw): a) THF, b) acetonitrile, c) acetone, d) DMF, e) DMSO. Solution concentration: 10 μM. Excitation wavelength: 315 nm.

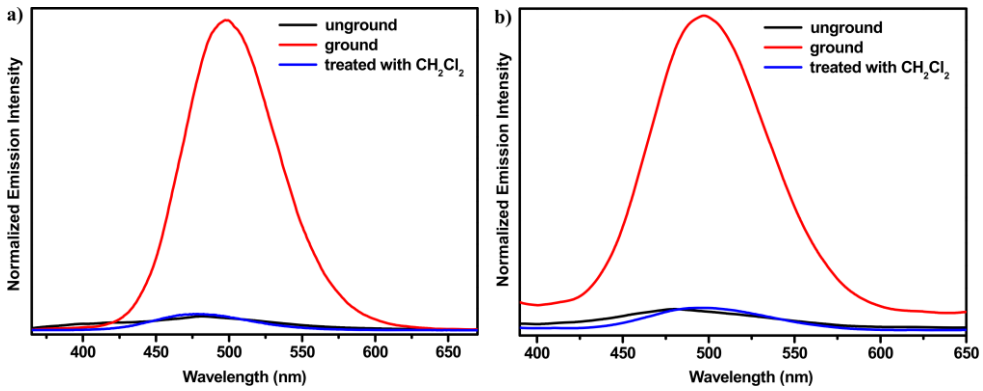

Fig. S11 Normalized PL spectra of **1b** (a) and **1c** (b) before grinding (black line), after grinding (red line), and after treatment with dichloromethane (blue line). Excitation wavelength: 350 nm.

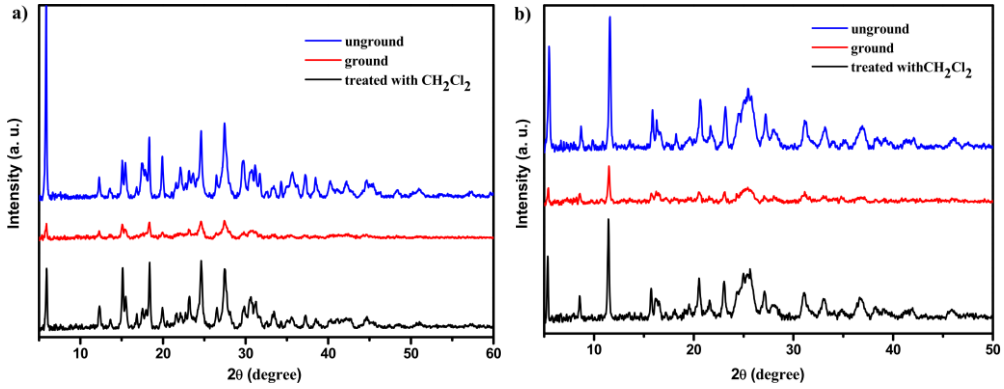

Fig. S12 XRD patterns of unground, ground and CH_2Cl_2 treated powders of luminogens **1b** (a) and **1c** (b).

Table S1 Phosphorescence decays τ, photoluminescence quantum yields Φ, rate constants for radiative k_r and nonradiative deactivation k_{nr} of excited states of the emission maxima of the luminogen **1a** at different mixture solutions and solid-state.

solvent	f_w	Excited-state lifetime					Φ	k_r / μs^{-1} [b]	k_{nr} / μs^{-1}[b]
		τ_1 (μs)	A_1	τ_2 (μs)	A_2	<τ> (μs)			
tetrahydrofuran	90	0.06	0.23	0.42	0.78	0.34	0.78	2.29	0.65
	80	0.01	0.82	0.13	0.18	0.03	0.05	1.67	31.73
acetonitrile	90	0.36	0.23	1.10	0.77	0.93	0.84	0.90	0.17
	70	0.19	0.23	0.62	0.77	0.52	0.34	0.65	1.26
acetone	90	0.36	0.21	1.10	0.79	0.94	0.99	1.05	0.01
	60	0.17	0.17	0.58	0.83	0.51	0.32	0.63	1.34
dimethyl formamide	90	0.36	0.21	1.17	0.79	1.00	0.38	0.38	0.62
	60	0.36	0.22	1.09	0.78	0.93	0.01	0.01	0.99
dimethylsulfoxide	90	0.36	0.25	1.15	0.75	0.95	0.17	0.18	0.88
	50	0.32	0.24	0.95	0.76	0.80	0.99	1.24	0.26
solid-state	unground	-	-	-	-	0.01	0.01	1.00	99.00
	ground	-	-	-	-	0.77	0.68	0.88	0.41

[a] An apparent decay time constant <τ> was determined by using the relation: $I = A_1\exp(-t/\tau_1)+A_2\exp(-t/\tau_2)+y_0$, where A_1/A_2 and τ_1/τ_2 are the fractions (A) and lifetimes (τ). The weighted mean lifetime <τ> was calculated according to the equation: $\langle\tau\rangle = (A_1\tau_1+A_2\tau_2)/(A_1+A_2)$.

[b] The radiative rate constant $k_r = \Phi/\langle\tau\rangle$; the nonradiative rate constant $k_{nr} = 1/\langle\tau\rangle - k_r$.