

Supporting Information for

Bis(8-hydroxyquinolate-5-sulfonate)zinc intercalated layered double hydroxides and its controllable luminescent properties

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1. Structural and compositional characterization of DDS–ZQS(x%)/LDH

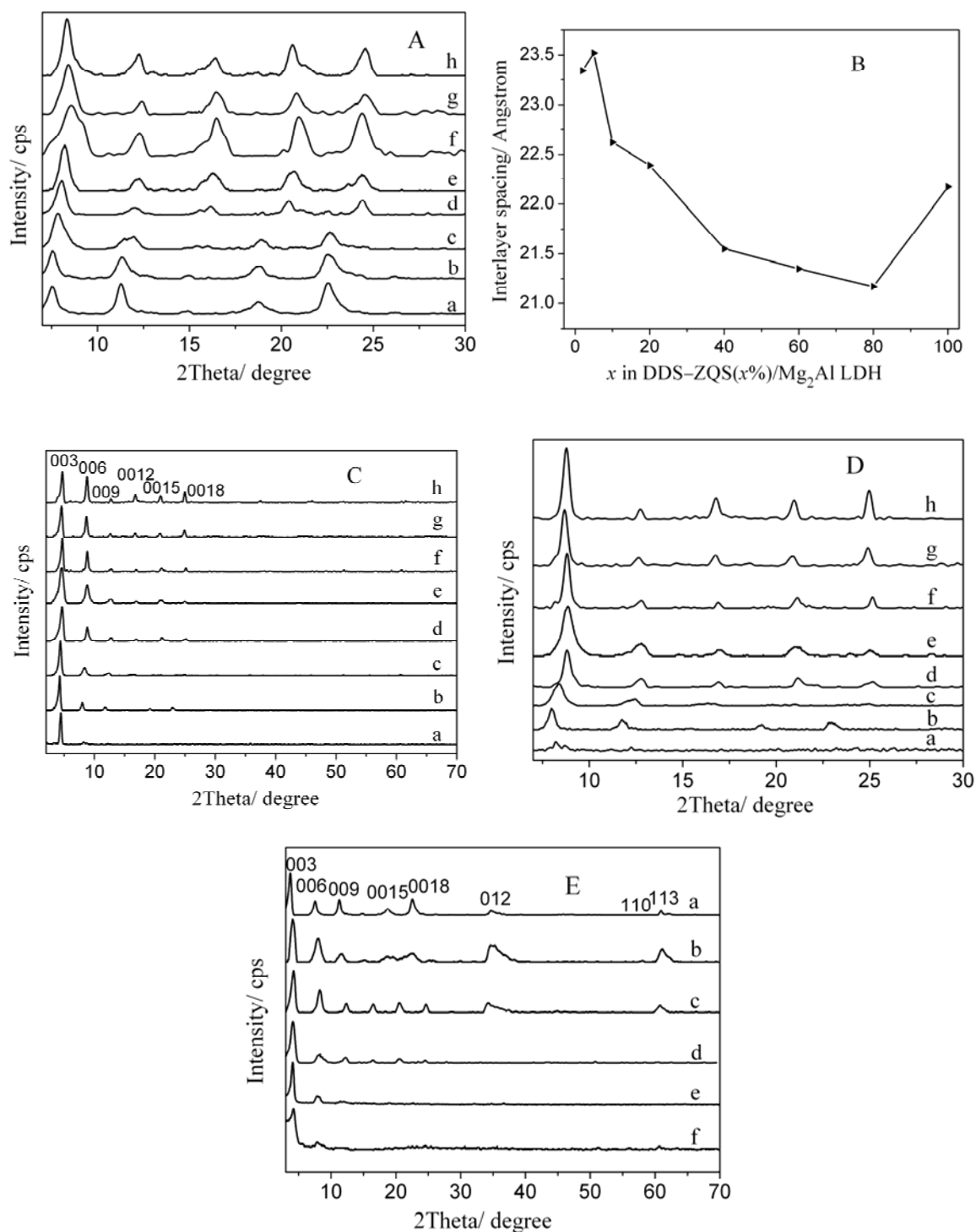


Figure S1. A) The XRD patterns of the low angle region for DDS–ZQS(x%)/ Mg₂Al LDH powder samples; B) The plots of interlayer spacing vs ZQS anions concentration x in DDS–ZQS(x%)/Mg₂Al LDH; C) The XRD patterns for the DDS–ZQS(x%)/ Mg₂Al LDH films and their XRD of low angle region, D): (a–h, $x = 2, 5, 10, 20, 40, 60, 80, 100$), respectively. E) The XRD patterns for powder samples of DDS–ZQS(5%)/M_{*n*}Al LDH (a – c: Mg₃Al, Zn₂Al, Zn₃Al) and (d – f) for film samples of (a – c), respectively.

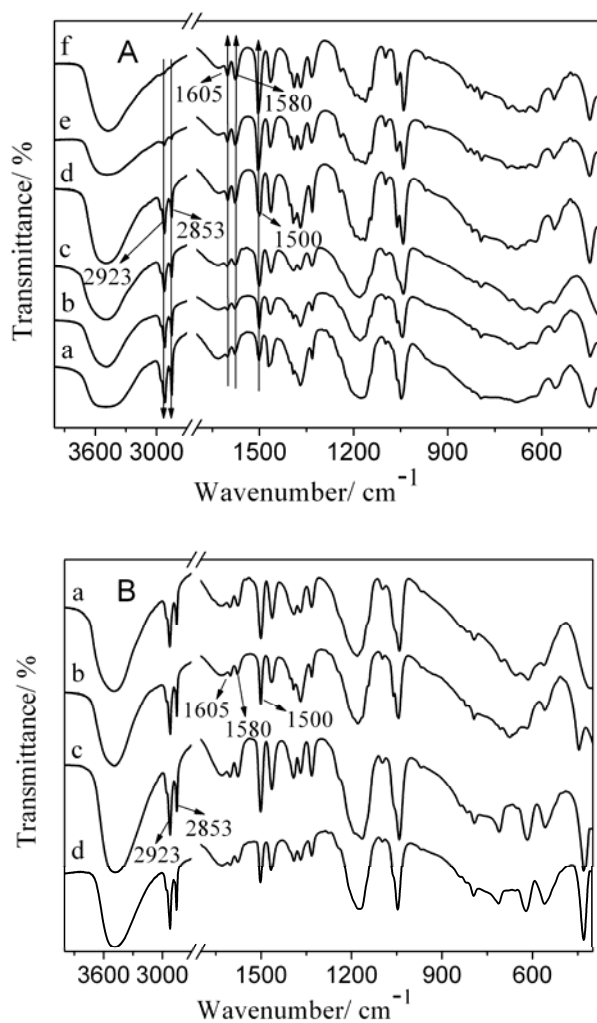


Figure S2. FT-IR spectra of A) DDS-ZQS(*x*%)/Mg₂Al LDH (a – f, *x* = 2, 10, 40, 60, 80, 100). B) (a) DDS-ZQS(5%)/Mg₂Al LDH, (b) DDS-ZQS(5%)/Mg₃Al LDH, (c) DDS-ZQS(5%)/Zn₂Al LDH, (d) DDS-ZQS(5%)/Zn₃Al LDH.

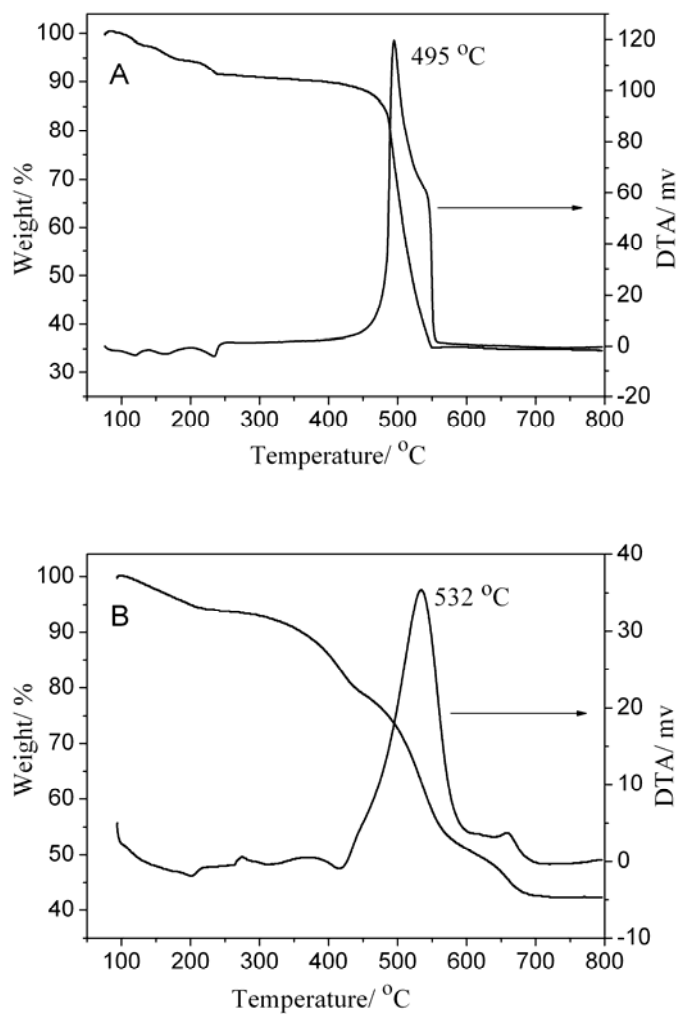
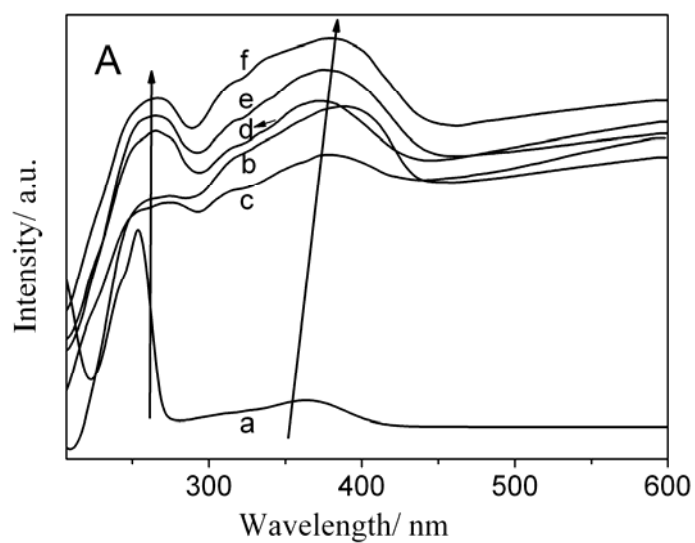


Figure S3. TG/DTA data for A) ZQS and B) ZQS(100%)/Mg₂Al LDH.

2. Optical properties of DDS-ZQS(x%)/LDH



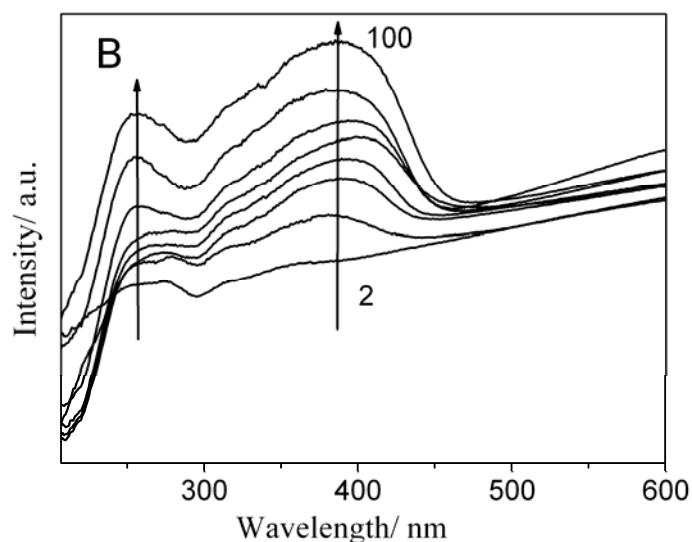


Figure S4. The UV-vis absorption spectra of A) (a) ZQS (5×10^{-5} M) aqueous solution, (b) ZQS crystal, (c) DDS-ZQS(5%)/ Mg_3Al LDH, (d) DDS-ZQS(5%)/ Mg_2Al LDH, (e) DDS-ZQS(5%)/ Zn_3Al LDH, (f) DDS-ZQS(5%)/ Zn_2Al LDH. B) DDS-ZQS(x%) / Mg_2Al LDH film ($x = 2, 5, 10, 20, 40, 60, 80, 100$).

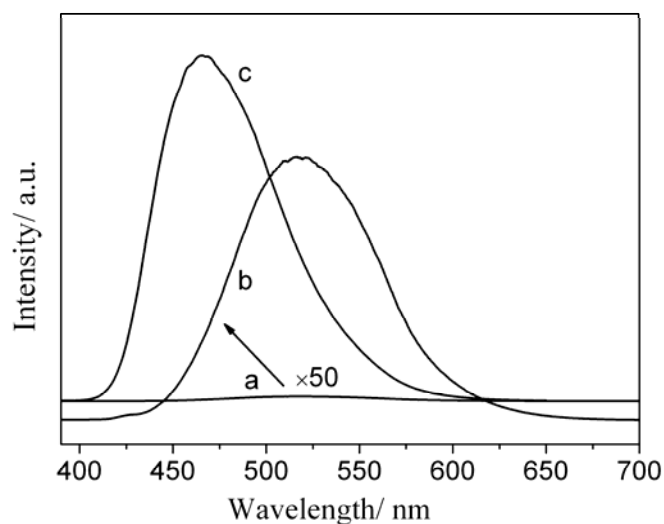


Figure S5. The photoluminescence spectra of a) ZQS (5×10^{-5} M) aqueous solution, b) magnified nearly 50 multiple of curve a, c) ZQS crystal with the excitation at 370 nm.

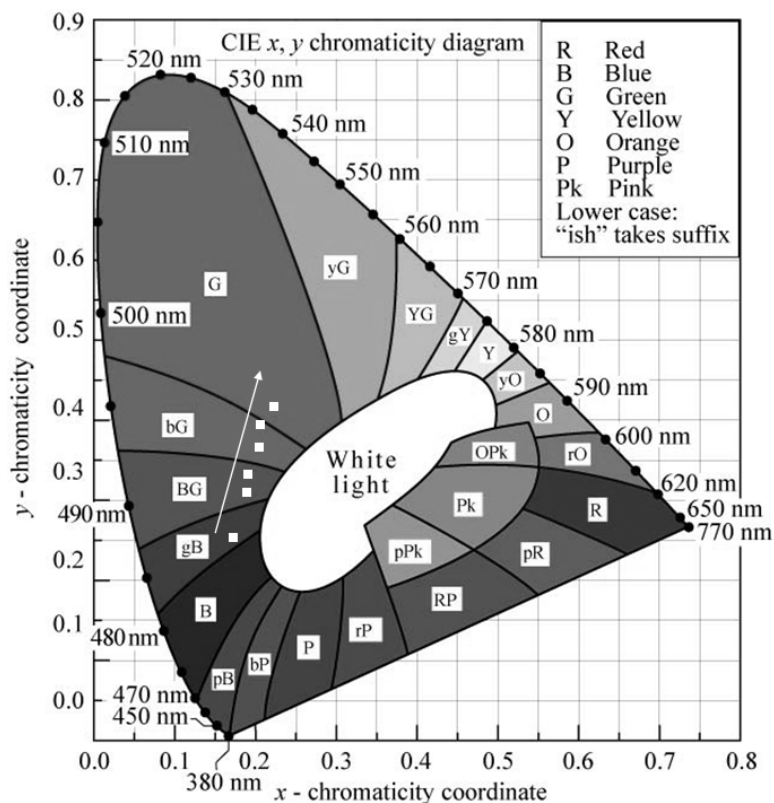


Figure S6. 1931 CIE chromaticity diagram for DDS-ZQS($x\%$)/Mg₂Al LDH powder ($x = 2, 5, 10, 40, 80, 100$, white square labels were marked with the varied direction indicated by the arrow).

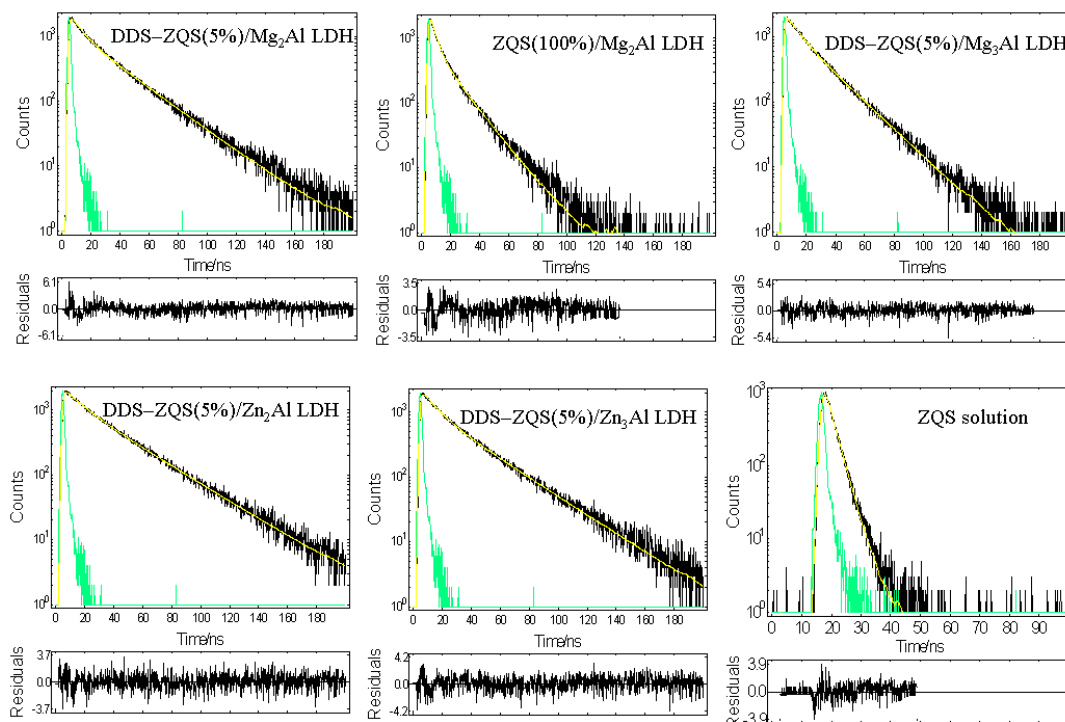


Figure S7. Fluorescence decay curves and residual plots of double-exponential fitting for the DDS–ZQS(*x*%)/LDH film samples with varied *x*, and one-exponential fitting for ZQS solution.

Table S1. The double-exponential fitting of fluorescence decay data of ZQS and DDS–ZQS(*x*%)/LDH film.

samples	τ_i (ns)	A_i (%)	$\langle\tau\rangle$ (ns)	χ^2
DDS–ZQS(2%)/Mg ₂ Al LDH	1.21	36.63	13.20	1.35
	20.13	63.37		
DDS–ZQS(5%)/Mg ₂ Al LDH	7.09	19.41	22.86	1.23
	26.66	80.59		
DDS–ZQS(10%)/Mg ₂ Al LDH	2.06	43.26	12.38	1.22
	20.24	56.74		
DDS–ZQS(40%)/Mg ₂ Al LDH	2.32	36.26	11.19	1.14
	18.24	56.74		
DDS–ZQS(80%)/Mg ₂ Al LDH	2.66	30.44	11.07	1.18
	14.75	69.56		
ZQS(100%)/Mg ₂ Al LDH	3.71	41.31	10.50	1.22
	15.28	58.69		
DDS–ZQS(5%)/Mg ₃ Al LDH	7.49	20.35	17.98	1.02
	20.66	79.65		
DDS–ZQS(5%)/Zn ₂ Al LDH	10.71	15.55	28.23	1.15
	31.46	84.45		
DDS–ZQS(5%)/Zn ₃ Al LDH	9.23	22.75	25.14	1.26
	29.83	77.25		
ZQS solution (5×10^{-5} M)	2.67	100	2.67	1.01
ZQS crystal	6.63	22.80	17.14	1.09
	20.24	77.20		