

A channel-structured Eu-based metal-organic framework with a zwitterionic ligand for selectively sensing Fe³⁺ ion

Yong-Qing Huang,^{*a} Huai-Ying Chen,^a Yang Wang,^a Yong-He Ren,^a Zong-Ge Li,^a Lu-Chao Li^a and Yan Wang^b

^aState Key Laboratory of Mining Disaster Prevention and Control Co-founded by Shandong Province and the Ministry of Science and Technology, College of Chemical and Environmental Engineering, Shandong University of Science and Technology, Qingdao 266590, China

^bSchool of Chemistry and Chemical Engineering, Anhui Key Laboratory of Functional Coordination Compounds, Anqing Normal University, Anqing 246011, China.

Corresponding Author:

Dr. Yong-Qing Huang

Email: yquangskd@163.com

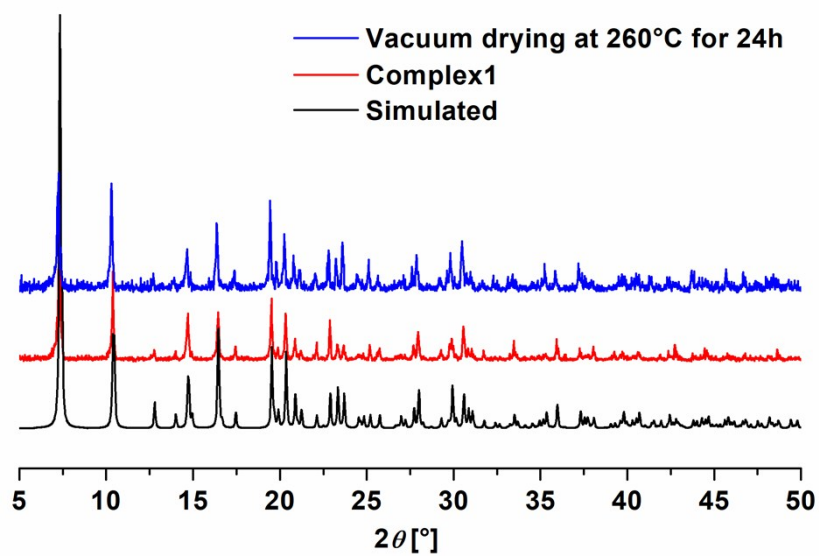


Fig. S1 Powder X-ray diffraction (PXRD) pattern of complex 1.

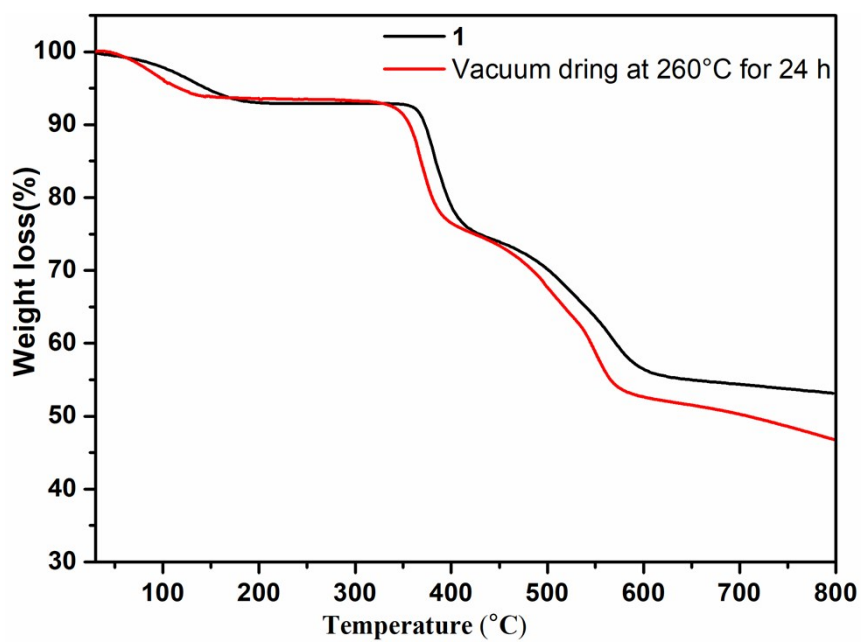


Fig. S2 TGA plots of complex 1.

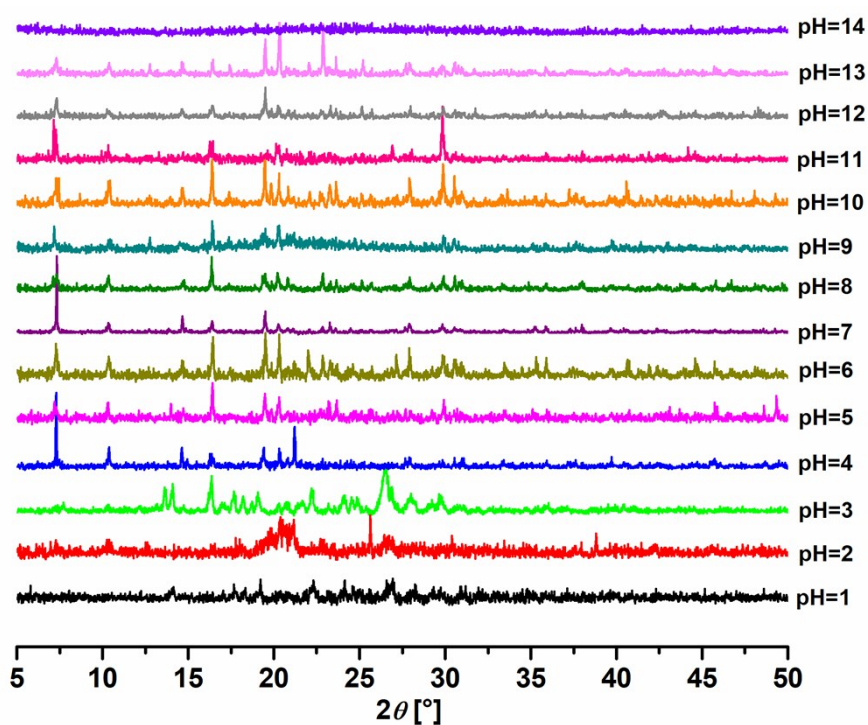


Fig. S3 Powder X-ray diffraction (PXRD) pattern of complex 1 in aqueous solution with different pH value.

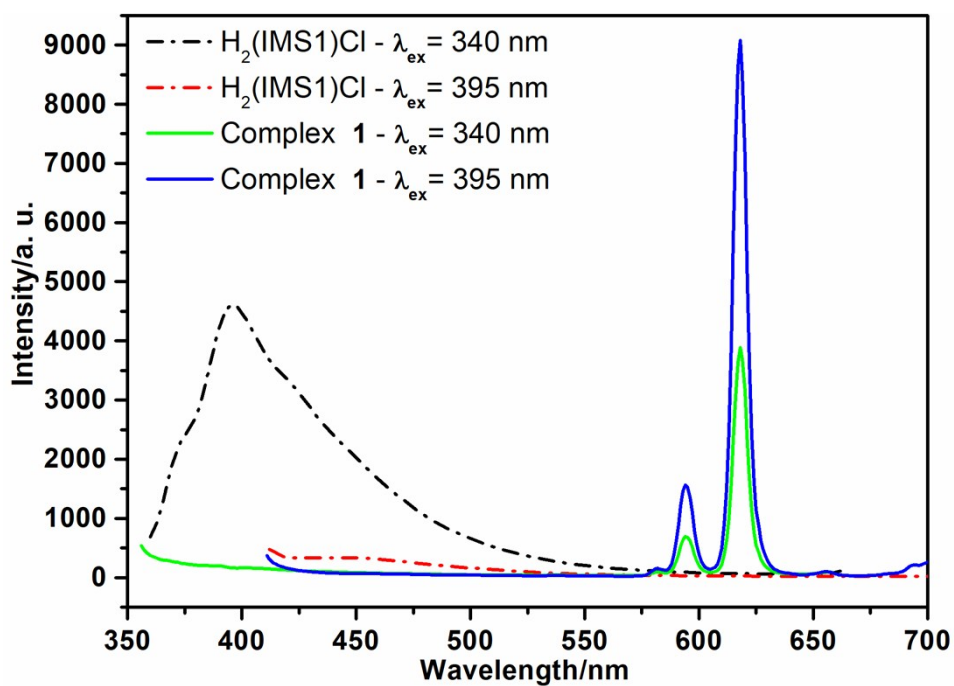


Fig. S4 The solid-state fluorescence spectra of ligand $H_2(IMS1)Cl$ and complex 1 upon the excitation at 340 nm and 395 nm, respectively.

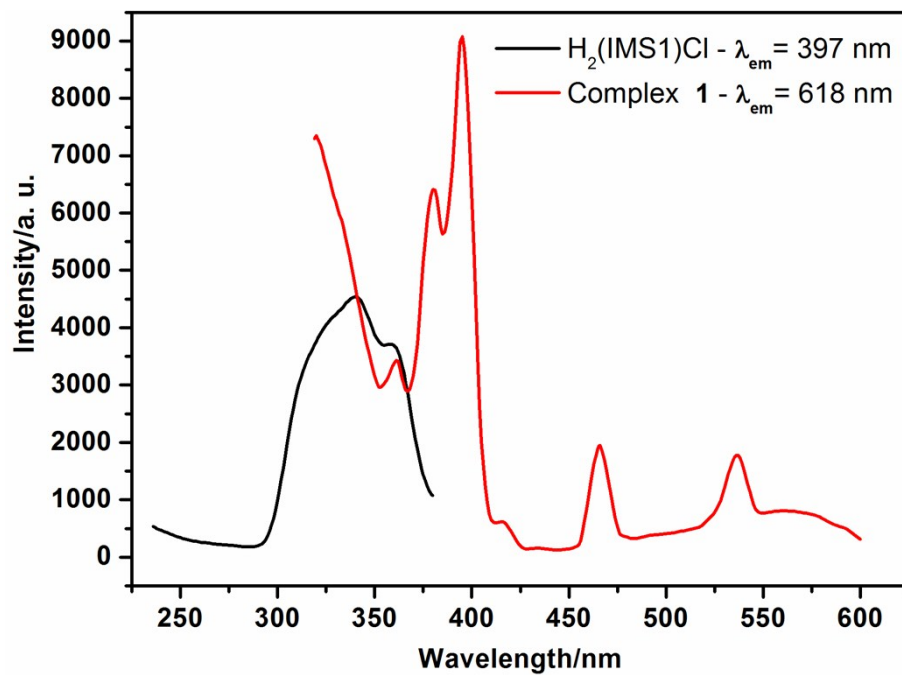


Fig. S5 The solid-state excitation spectra of ligand H₂(IMS1)Cl and complex **1** upon the emission at 397 nm and 618 nm, respectively.

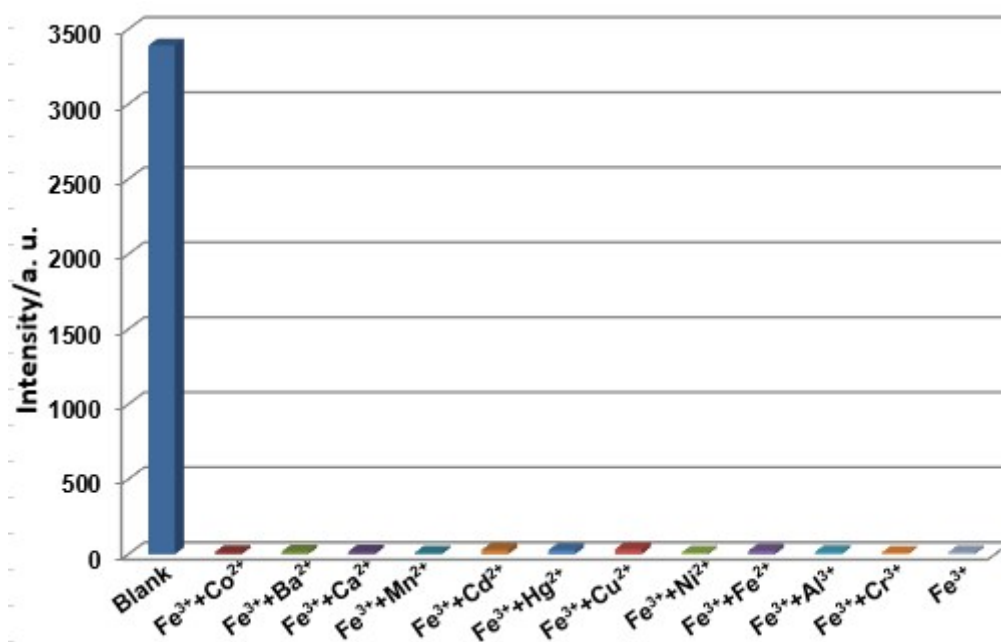


Fig. S6 Fluorescence response of **1** towards 0.1 M Fe³⁺ and different metal cations upon the excitation at 395 nm.

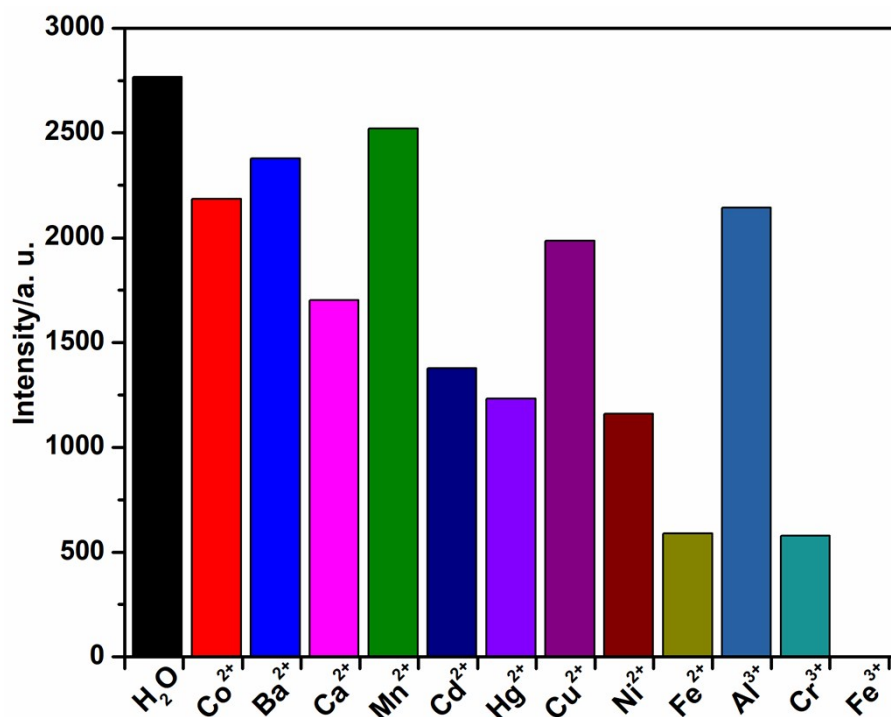


Fig.S7 Comparison of the luminescence intensity of ligand H₂(IMS1)Cl in different MCl_x aqueous solutions (0.1 M) upon excitation at 340 nm.

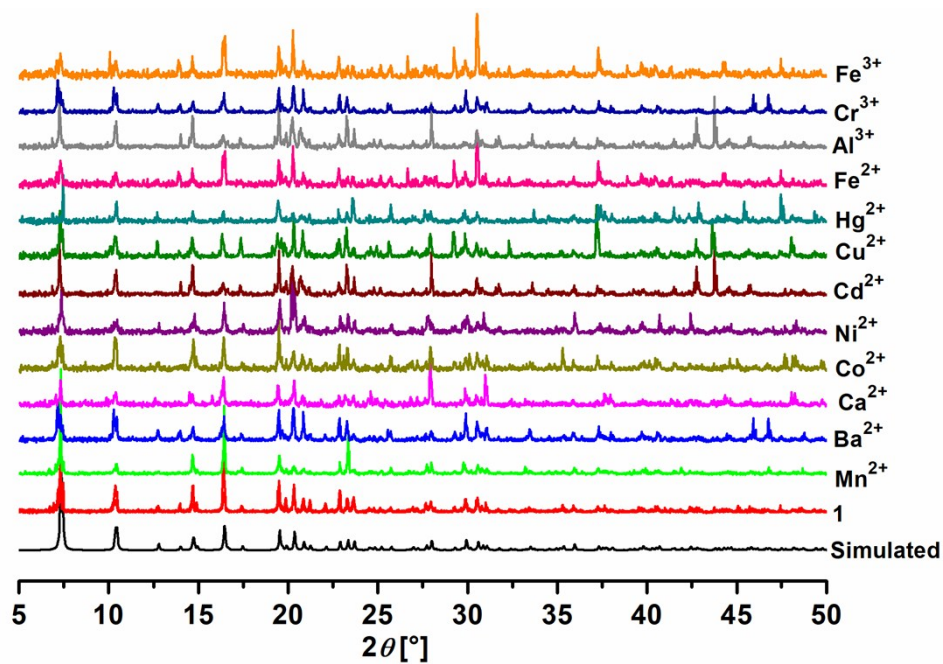


Fig. S8 Powder X-ray diffraction (PXRD) pattern of complex 1 in different cationic aqueous solution.

Table S1 Comparison of the detecting range, K_{sv}, LOD and Media

Detectors based on Complexes	Detecting range of Fe ³⁺ concentration (mol/L)	K _{sv} (L/mol)	LOD (mol/L)	Media	Ref
[(CH ₃) ₂ NH ₂] ₂ [Tb(bptc)] ₂ xsolvents	0.0 - 1.0×10 ⁻⁴	2.6×10 ⁵	1.8×10 ⁻⁴	Ethanol	1
[Zn ₅ (hfipbb) ₄ (trz) ₂ (H ₂ O) ₂]	0.0 - 1.0×10 ⁻⁴	4.1×10 ⁵	1.8×10 ⁻⁴	H ₂ O	2
[Cd(Hcbic)] _n	0.0 - 1.3×10 ⁻³	1.8×10 ⁵	3.1×10 ⁻⁵	H ₂ O	3
[Eu(Hpzbc) ₂ (NO ₃) ₂] ₂ ·H ₂ O	0.0 - 2.2×10 ⁻⁴	-----	2.6×10 ⁻⁵	Ethanol	4
[Zn ₂ (L) ₂ (bpe) ₂ (H ₂ O) ₂]	0.0 - 1.0×10 ⁻³	2.4×10 ³	2.5×10 ⁻⁵	H ₂ O	5
[Eu(IMS1) ₂] ₂ Cl·4H ₂ O	0.0 - 1.0×10 ⁻³	5.9×10 ³	2.3×10 ⁻⁵	H ₂ O	This work
{[Eu ₂ L _{1.5} (H ₂ O) ₂ EtOH]·DMF} _n	0.0 - 0.5×10 ⁻³	2.9×10 ³	1.0×10 ⁻⁵	DMF	6
{(Me ₂ NH ₂) ₂ [Tb(oba) ₂] ₂ (Hatz) ₂ (H ₂ O) _{1.5} } _n	0.0 - 1.0×10 ⁻⁴	3.4 × 10 ⁴	1.0×10 ⁻⁶	H ₂ O	7
{Eu-HODA(H ₂ O) ₄ (H ₂ O)} _n	0.0 - 3.0×10 ⁻⁴	2.1 × 10 ⁴	1.0×10 ⁻⁷	H ₂ O	8

H₄bptc= tetracarboxylic acid

H₂hfipbb = 4, 4'-(hexafluoroisopropylidene)bis(benzoic acid), Htrz = 1H-1,2,3-triazole

H₃cbic = 1-(4-carboxybenz-yl)-1H-benzimidazole-5, 6-dicarboxylic acid

H₂pzbc = 3-(1H-pyrazol-3-yl) benzoic acid

L = 4,4'-((1,2- phenylenebis(methylene))bis(oxy))dibenzoic acid

bpe = (E)-1,2-di(pyridin-4-yl)ethene

L = 5, 5'-(carbonyl-bis(azanediyl))diisophthalic acid

H₂oba = 4, 4'-oxybis(benzoate), Hatz = 3-amino-1,2,4-triazole

H₄ODA = 2, 2', 3, 3'-Oxidiphthalic acid

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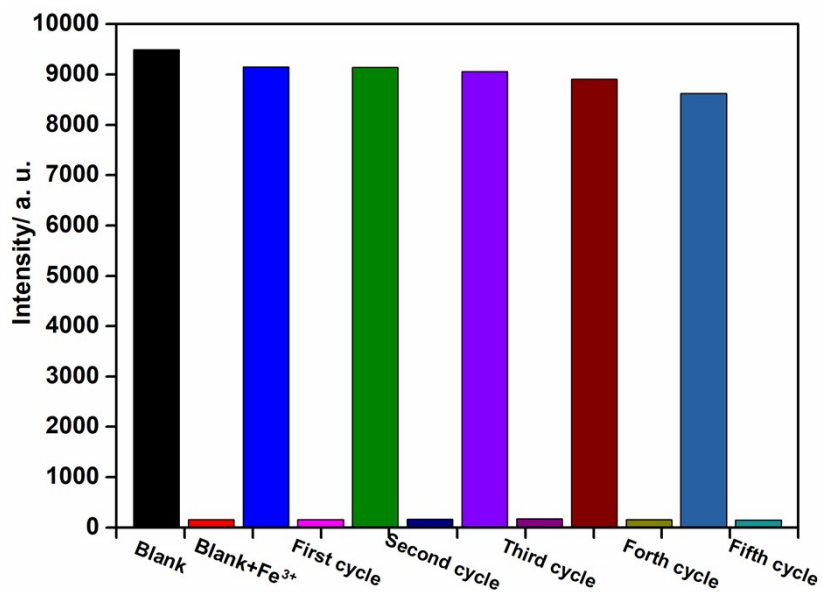


Fig. S9 The reversibility test for sensing Fe³⁺. The luminescence intensity of **1**, recycled **1** and Fe³⁺@**1**.

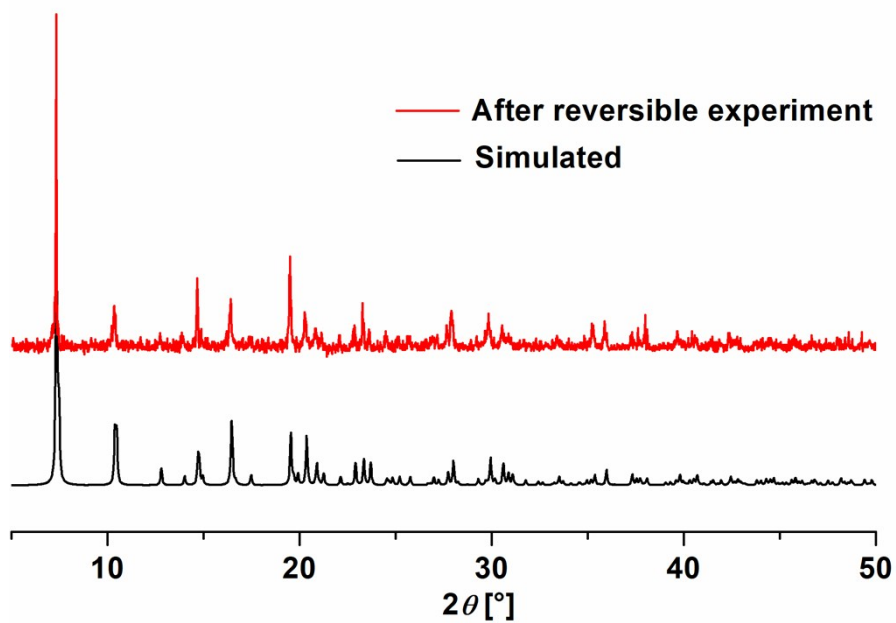


Fig. S10 The PXRD pattern of **1** after five sensing-recovery circles.

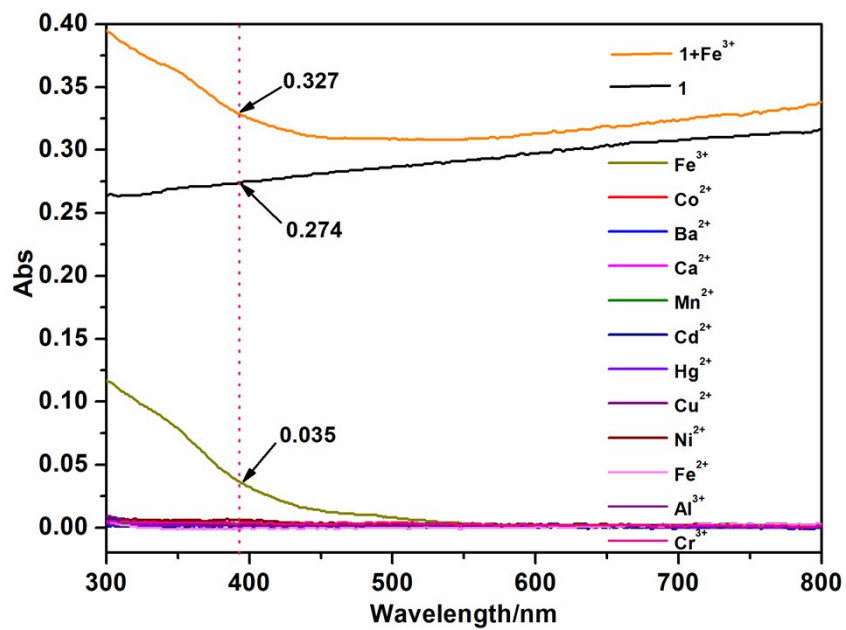


Fig. S11 Absorption spectra of water-solution containing Fe³⁺ and other metal ions (10⁻⁴ M), suspension of complex **1** and suspension of complex **1** with Fe³⁺.