Two dimethylphenyl imidazole dicarboxylate-based lanthanide metal–organic frameworks for luminescence sensing of benzaldehyde

Bingbing Shi, Yuanhao Zhong, Li Guo and Gang Li*

College of Chemistry and Molecular Engineering, Zhengzhou University, Zhengzhou 450001, Henan, P. R. China

Supporting information

IR characterization

The IR spectra display characteristic absorption bands for carboxylate, imidazolyl units, phenyl units. Compounds **1** and **2** show absorption bands in the range of 3400-3500 cm^{-1}, which may be attributed to $\nu_{N\text{-}H}$ or $\nu_{O\text{-}H}$ stretching frequencies of the imidazole ring or carboxylate group, respectively. The coordination of the carboxylate can be seen from the absorption bands in the frequency range 1381-1633 cm^{-1} in **1** and **2** due to νas(COO-) and νs(COO-) vibrations respectively. The strong bands in the range of 2919-3154 cm^{-1} and broad absorption bands in the range of 1633-1548 cm^{-1} in complexes **1** and **2** imply the C=N and C=C stetching bands of imidazole ring in H3DMPhIDC. The characteristic IR band of the phenyl ring at 733-879 cm^{-1} is due to δ=C-H vibrations. In conclusion, the infrared spectral data of the complexes **1** and **2** are consistent with crystal structure analysis.

College of Chemistry and Molecular Engineering, Zhengzhou University, Zhengzhou 450001, Henan, P. R. China.
E-mail: gangli@zzu.edu.cn

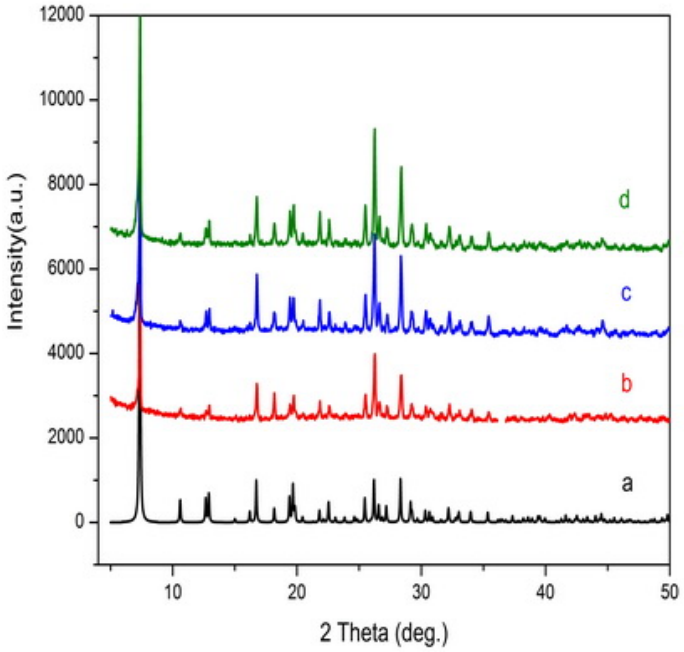


Figure S1. Powder X-ray diffraction patterns of (a) simulated from the crystal data of **1** (b) as-synthesized **1**, and the diffraction patterns of **1** obtained after the introduction of various solvents: (c) ethanol, (d) benzaldehyde.

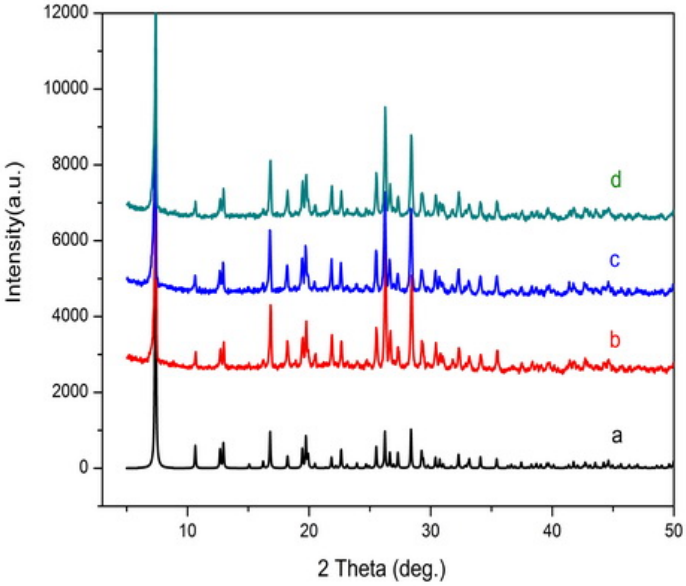
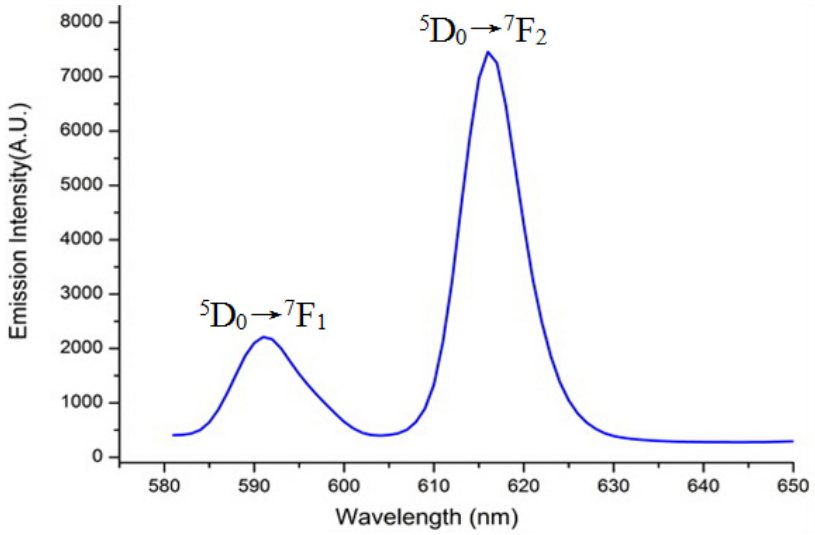
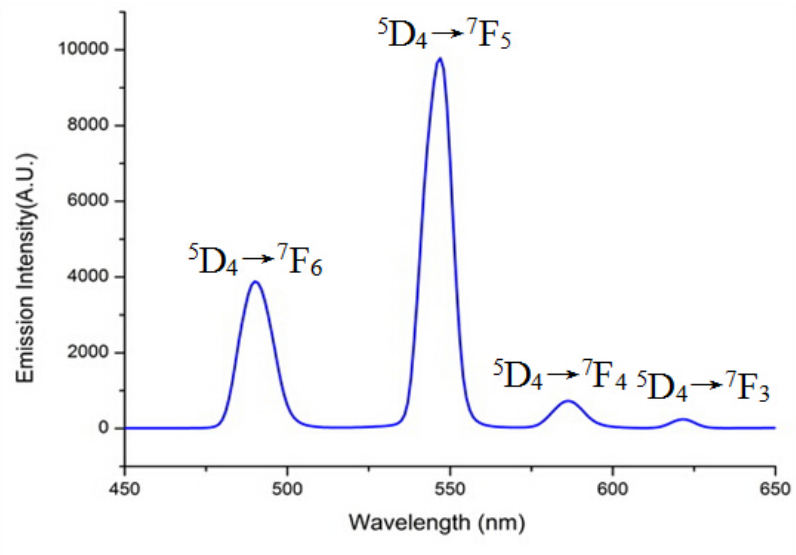


Figure S2. Powder X-ray diffraction patterns of (a) simulated from the crystal data of **2**. (b) as-synthesized **2**, and the diffraction patterns of **2** obtained after the introduction of various solvents: (c) ethanol, (d) benzaldehyde.

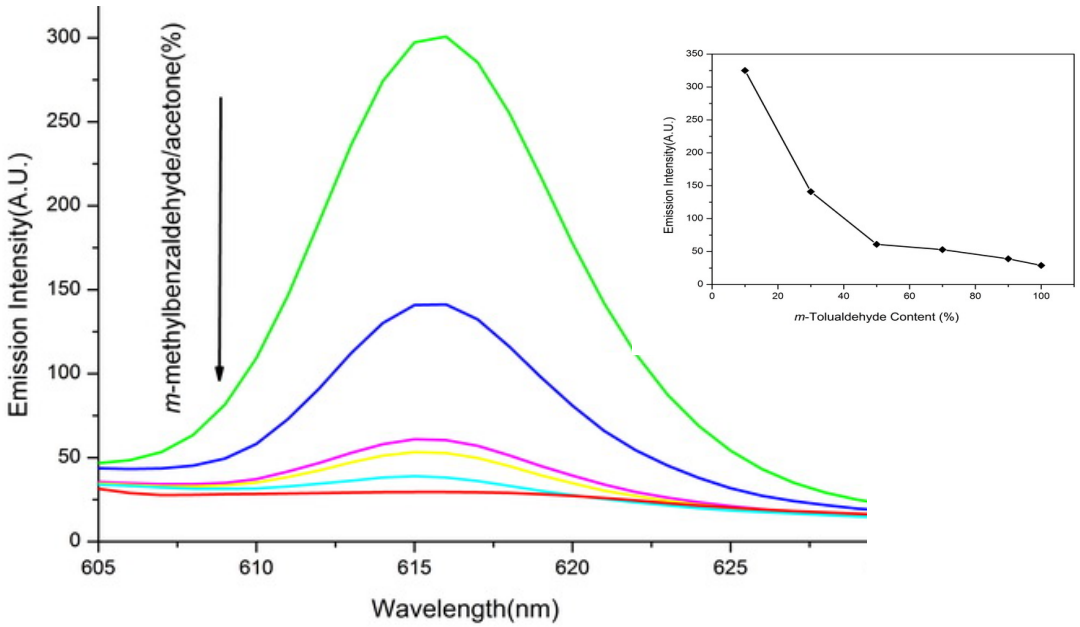


(a)

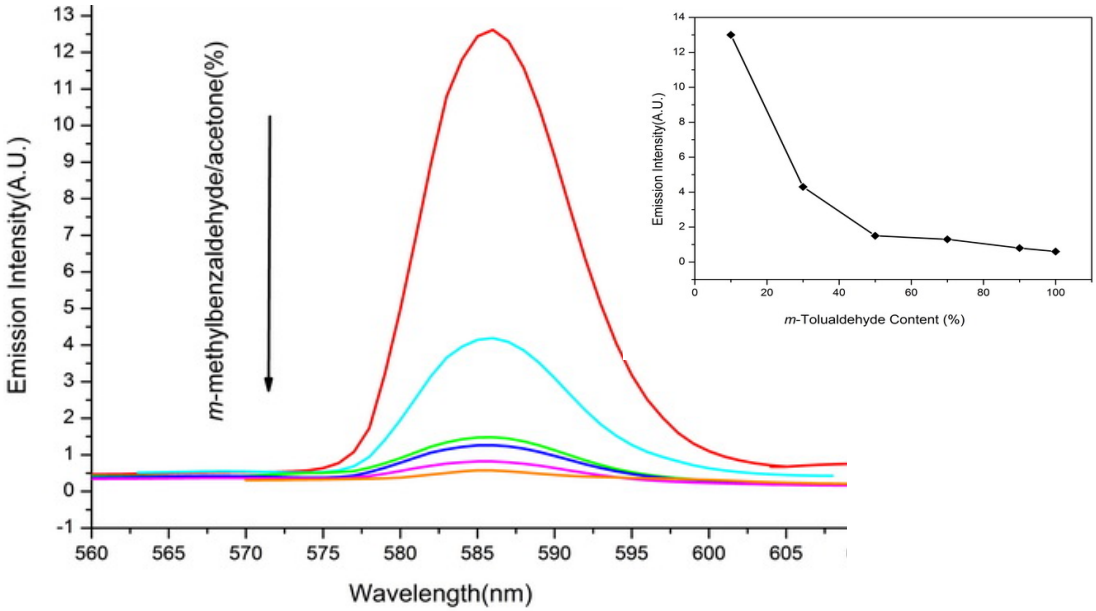


(b)

Figure S3. (a) Emission spectrum of **1** in solid state excited at 345 nm. (b) Emission spectrum of **2** in solid state excited at 332 nm.



(a)



(b)

Figure S4. (a) Emissive response spectra of **1** for *m*-methylbenzaldehyde in acetone solution with different *m*-methylbenzaldehyde volume concentrations (insert is graph of the fluorescent intensity of **1** acetone as a function of *m*-methylbenzaldehyde content). (b) Emissive response spectra of **2** for *m*-methylbenzaldehyde in acetone solution with different *m*-methylbenzaldehyde volume concentrations (insert is graph of the fluorescent intensity of **2** acetone as a function of *m*-methylbenzaldehyde content).