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Supporting Information

Zeolitic Imidazolate Framework-8 as a Luminescent Material for the Sensing of Metal Ions and Small Molecules

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This supporting information provides the N_2 sorption isotherms of ZIF-8 at T=77K and the emission decay curves of ZIF-8, ZIF-8/Cu^{2+}, and ZIF-8/Cd^{2+}.

1. Gas Adsorption Measurements.

N_2 adsorption isotherm of ZIF-8 at 77 K was measured and shown in Fig. S1. It is found that ZIF-8 exhibits type I isotherm characteristic with a Langmuir surface area of 1501 m^2/g.

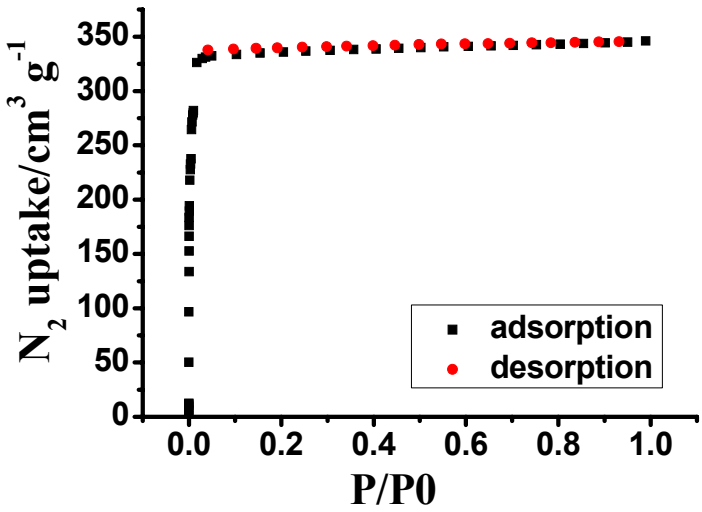

Fig. S1 N_2 sorption isotherms for ZIF-8 at T=77K.

2. Lifetime Measurements

Time-resolved emission measurements were used to further understand the luminescence quenching (Cu^{2+}) and enhancing (Cd^{2+}) effects, and the emission decay curves are shown in Fig. S2. Emission lifetimes (τ) were determined by fitting the decay curves to a triple exponential function: $I(t) = A + B_1 e^{-t/\tau_1} + B_2 e^{-t/\tau_2} + B_3 e^{-t/\tau_3}$ where A is the constant, B is the pre-exponential factor, and t is the time. ZIF-8, ZIF-8/Cu^{2+} and ZIF-8/Cd^{2+} were fitted to triexponentials. The luminescent lifetimes were as follows: τ_1=1.18 ns, τ_2=6.51 ns and τ_3=28.83 ns for ZIF-8; τ_1=0.36 ns, τ_2=4.46 ns and τ_3=26.19 ns for ZIF-8/Cu^{2+}; τ_1=0.98 ns, τ_2=6.26 ns and τ_3=29.39 ns for ZIF-8/Cd^{2+}. Apparently, the Cu^{2+}-incorporated 1a has a shorter emission lifetime than 1a, which is in agreement with the decrease of the PL intensity (i.e. the quenching effect). Meanwhile, the Cd^{2+}-incorporated 1a has a longer emission lifetime than 1a, which is in agreement with the increase of the PL intensity (i.e. the enhancing effect).

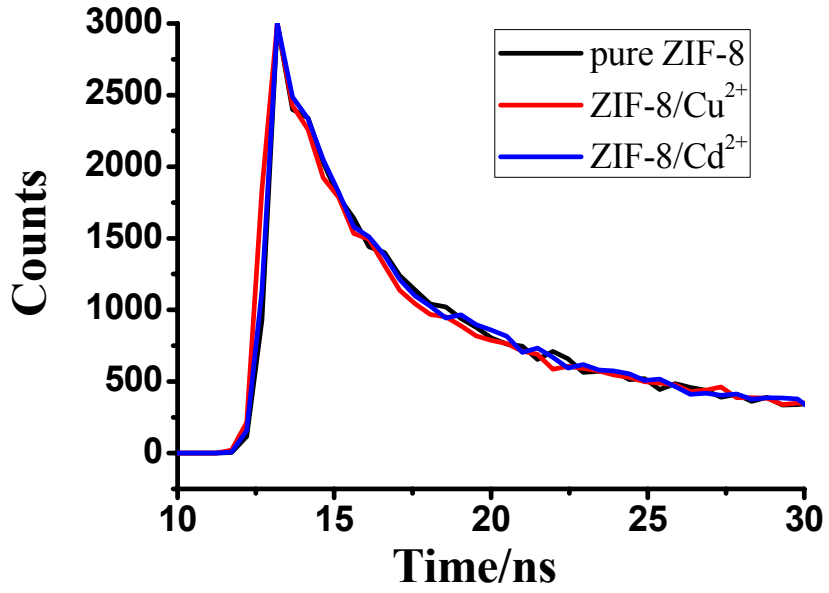

Fig. S2 Emission decay curves of ZIF-8 (black), ZIF-8/Cu^{2+} (red), and ZIF-8/Cd^{2+} (blue)