Electronic Supplementary Material (ESI) for Analytical Methods.

N-Doped molybdenum oxide quantum dots as fluorescent probes for the quantitative detection of copper ions in environmental samples

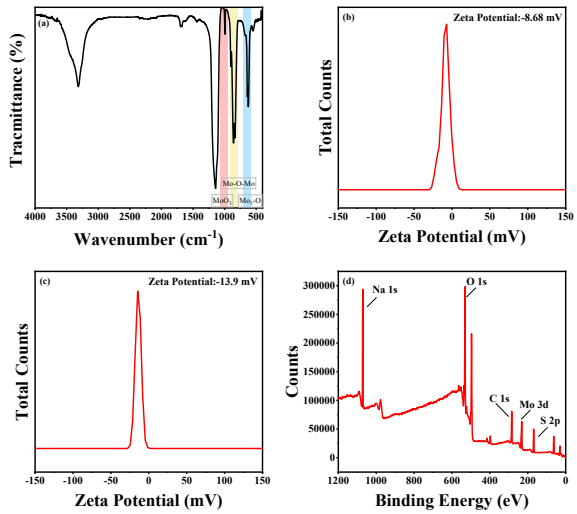

Fig. S1 FT-IR spectrum of the as-prepared MoOx QDs (a). Zeta potential of MoOx QDs and N-MoOx QDs (b, c). XPS spectrum of MoOx QDs (d).

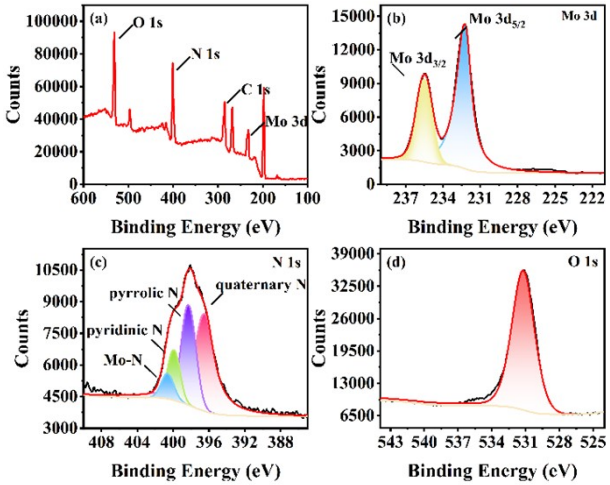

Fig. S2 XPS spectra of N-MoOx QDs, all elements (Mo, C, N, and O) (a), Mo 3d (b), N 1s (c), and O 1s (d).

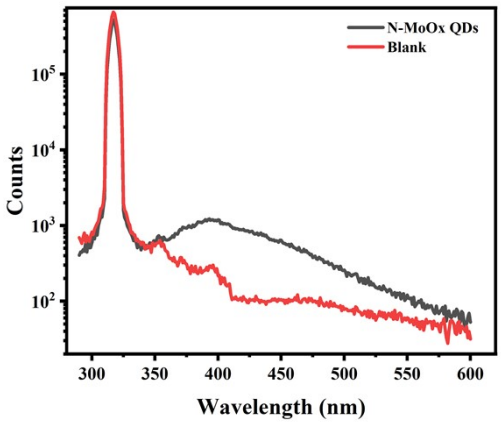

Fig. S3 Quantum yield of N-MoOx QDs.

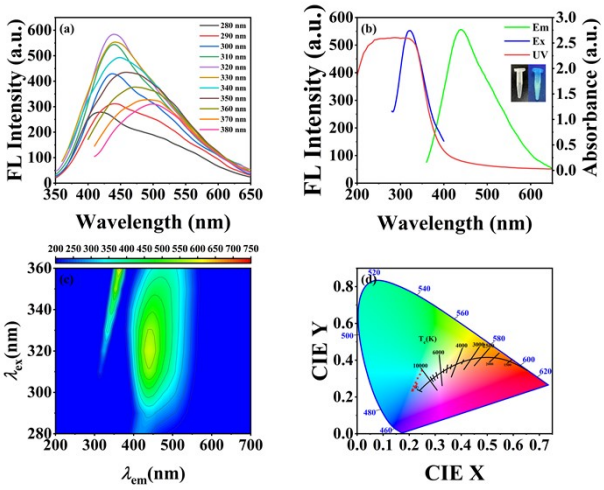

Fig. S4 UV–vis absorption, optimal excitation and emission spectra of MoOx QDs (a). (The inset is photograph under visible light or under 365 nm UV lamp.) Fluorescence spectra of MoOx QDs under different excitation wavelengths (b). Three-dimensional fluorescence spectra of MoOx QDs (c) and the corresponding CIE coordinate diagram of MoOx QDs (d).

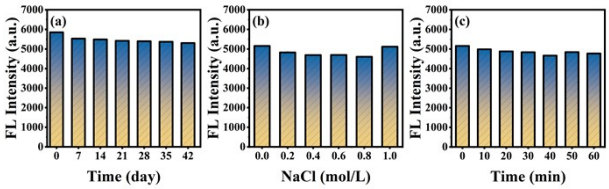

Fig. S5 Effects of storage time (a), ionic strength (b), and the irradiation time (c) on the fluorescence intensity of the N-MoOx QDs.

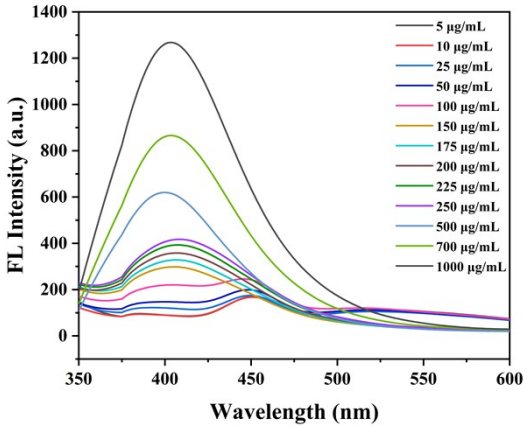

Fig. S6 Fluorescence responses of N-MoOx quantum dots in aqueous solutions with different concentrations.

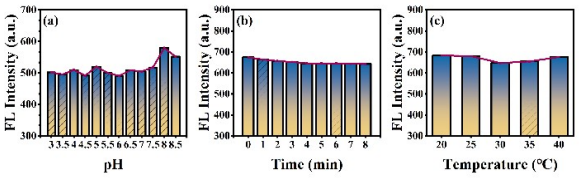

Fig. S7 Effects of pH (a), reaction time (b), and reaction temperature (c) on the N-MoOx QDs-Cu^{2+} system.

Table S1. Instruments used in the experiment.

Instruments	Manufacturer	Model
X-ray diffractometer	Bruker, Germany	Bruker D8
Ultraviolet-visible spectrophotometer	Purkay, China	TU-1901
Infrared spectrometer	Thermo Fisher Scientific	Nicolet iS50
Transmission electron microscope	JEOL, Japan	JEM-2100
Fluorescence spectrophotometer	Edinburgh, United Kingdom	FLS 980
X-ray photoelectron spectroscopy	Thermo Fisher Scientific	Escalab 250Xi
fluorescence spectrophotometer	Lengguang, China	F97-pro

Table S2. CIE coordinate coefficient of N-MoOx QDs.

Wavelength (nm)	280	290	300	310	320	330
x	0.16244	0.16045	0.15823	0.15707	0.15698	0.15708
y	0.09298	0.08094	0.07377	0.07043	0.07056	0.07321
Wavelength (nm)	340	350	360	370	380	390
x	0.15705	0.1571	0.1572	0.15777	0.15934	0.16219
y	0.0794	0.08863	0.1011	0.11633	0.13568	0.15791

Table S3. CIE coordinate coefficient of MoOx QDs.

Wavelength (nm)	280	290	300	310	320	330
x	0.22704	0.2292	0.222	0.21517	0.21218	0.21335
y	0.5232	0.5104	0.4937	0.4837	0.4635	0.24106
Wavelength (nm)	340	350	360	370	380	
x	0.21799	0.22491	0.23283	0.2417	0.24892	
y	0.2579	0.2786	0.30128	0.32267	0.34258	